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Man's face and mimic language

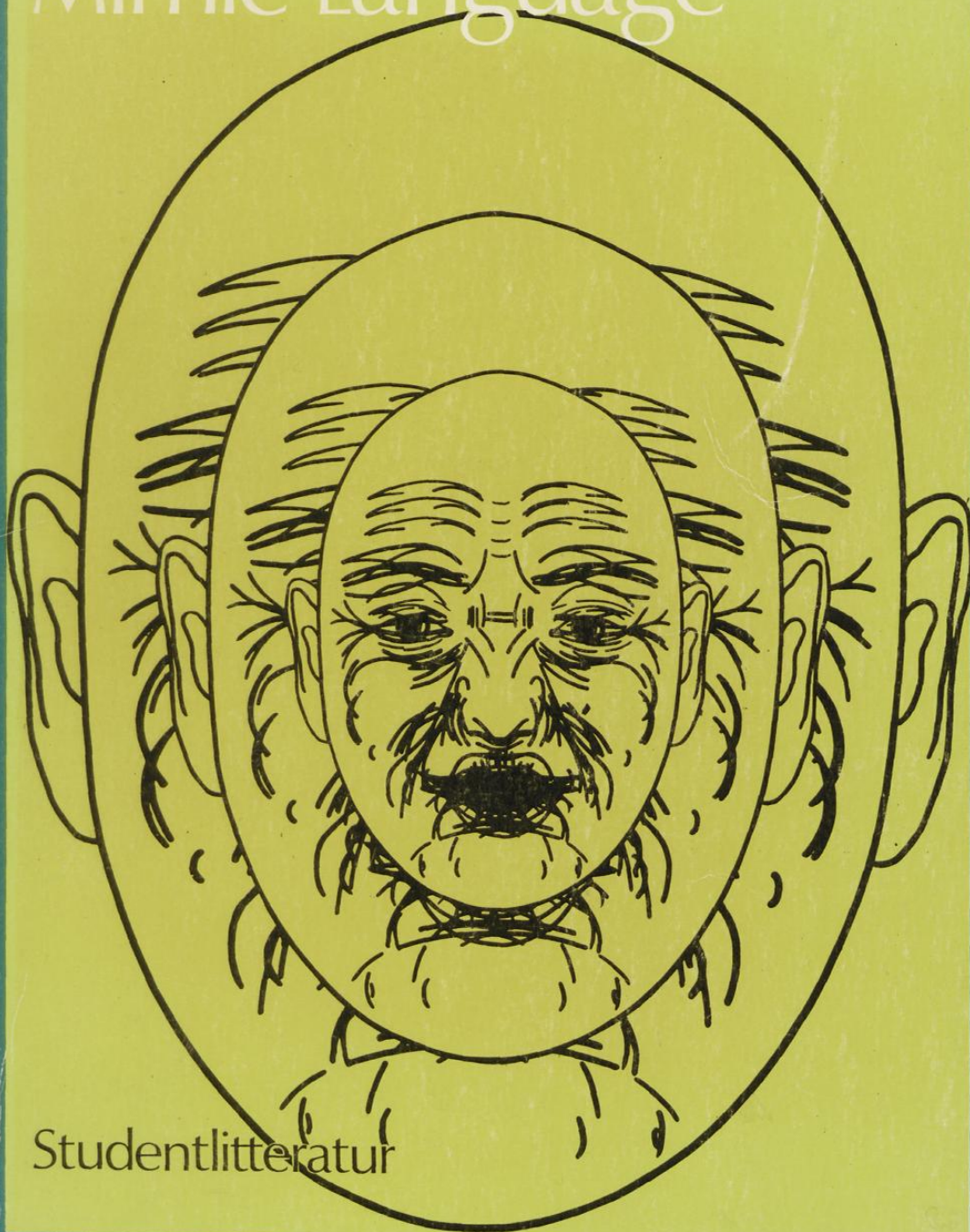
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Carl-Herman Hjortsjö

Man's Face and Mimic Language



Studentlitteratur

Carl-Herman Hjortsjö

Man's Face
and
Mimic Language

Studentlitteratur Lund Sweden

“He that winketh with the eye
causeth sorrow:
But the foolish of lips
shall be overthrovon.”

(PROV. X, V. 10)

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Carl-Herman Hjortsjö

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Preface

It is probably no exaggeration to say that mimicry is the primary language of mankind and of the individual. Facial mimicry and other expressive movements must have been primitive man's attempt to communicate with strangers who spoke to him in an unknown and unintelligible tongue. Through mimicry, the first mental contact is achieved between the child in the cradle and its mother.

That mimicry and mimic movements exist also in some form in the animal kingdom as a stage in the silent communication of animals one with another is nowadays generally accepted. Thus it can be seen that the capacity for creating mimicry to express thoughts, feelings, and desires must be something fundamental, something that lies safely anchored in the genes. Therefore, we humans are extremely sensitive to changes in the facial expressions of our fellows. This has also set its mark on the use of language when, for instance, we speak of "turning up the nose", of "turning down the corners of the mouth", of "lowering the brows" and of "clenching the teeth" in the sense of "expressing disapproval", of "being unhappy", of "being angry", and of "collecting or bracing oneself to face future difficulties". Expressions such as "a sly and dishonest look in the eye", "a sensual line over the lips", and "a placid, untroubled forehead" are also heard. But if anyone is asked to describe objectively the observation that led to the, perhaps in itself completely correct, conclusion, there would in most cases probably be no answer. We understand — or think we understand — the silent language of mimicry, which we too can employ, but are ignorant of the letters of the language and the spelling of the words.

Considered against that background, it is rather remarkable that so few really serious attempts have been made to investigate and systematize the muscular activities that create certain decisive facial expressions. Our current anatomical textbooks, of course, give a thorough account of the most important functions of each individual muscle. But the effects on the face produced by each muscle are only parts of the letters of the mimic language. No real mimic synthesis — i.e. a combination of the muscular effects first into letters, then into mimic words — could be found by the author in a survey of the literature. An exception is the account given by

the German physician Fritz Lange in his work "Die Sprache des Menschlichen Antlitzes" (München 1952). Many of the conclusions presented in this work, however, seem to the present author to be highly debatable. The small handbook for photographers, artists, picture directors, and models, entitled "Posing for the Camera" by Harriett Shephard and Lenore Meyer (London 1960), is also of value.

This insufficient knowledge concerning the play of muscles that underlie the mimic facial expressions has also impelled the author, who has over the years studied various motion-mechanical conditions in the human body, to penetrate more closely into the matter and the problems involved. The result is the work presented here.

The subject is primarily of interest to medical and odontological students, for whom it is intended as a supplementing textbook. But also physicians (here the author has in mind mainly psychiatrists and plastic surgeons), dentists, anthropologists, psychologists, teachers of the deaf and dumb, portrait painters and portrait photographers, artists, actors, and make-up men can — perhaps within their own spheres — find use for it. Besides the circle of experts, the general public who take an interest in facial analysis and portrait interpretation may find something of value here.

The potential readers thus have considerably widespread interests and therefore start the study with altogether different basic outlooks. This has set its mark on both the content of the work and its wording. Some sections discuss conditions that must be well known to some experts, but a description of them was inevitable with regard to other readers. The author is also fully conscious that several discussions are of a somewhat heavy and complicated nature. However, if the nucleus of the problem is to be approached, it is necessary to know thoroughly the elements that compose the problem.

It can be difficult to provide descriptions and accounts in such a way that also the layman can profit from them, especially as certain technical terms often must inevitably be employed. Unfortunately, the following is therefore encumbered with explanations that can, to some readers, seem quite superfluous. Current English names are used to describe various anatomical details; for the group of medical and odontological students, the Latin terms are given in parentheses.

As far as possible, the author has tried to illustrate the work with photographs, diagrams, and schematic drawings. When these are taken from other works, this is mentioned in the captions. Other illustrations, of which the author's original drawings are models, may readily be used by other authors providing the source is acknowledged.

University of Lund, Sweden, 1970

Carl-Herman Hjortsjö

Introduction

A special form of art developed early among the ancient Greeks in Sicily. It had the nature of a dramatic folk-play in the burlesque genre where different persons appeared and imitated people and animals to the delight of the audience. This form of art was therefore called *mimos* after the Greek verb *mimeisthai*, which means "to imitate". Each of the actors taking part in the *mimos* was also called *mimos*.

During the fifth century B.C., the *mimos* in Sicily reached its artistic climax, which must probably be chiefly ascribed to the Sicilian poet Sofron from Syracuse. His *mimos* texts, written in rhythmic prose, gave the *mimos* a place in literature; however, it failed to achieve any great reputation as a literary product. Via the Greeks in southern Italy, the *mimos* early spread to Rome too, where it became Latinized and enjoyed considerable popularity. Publilius Syrus and Decimus Laberius, both active during the reign of Caesar, were the foremost Roman *mimos* authors. The *mimos* could also be performed without any kind of text as a pantomime, possibly combined with descriptive dances (compare with the present-day ballet).

The concept mimicry, with the adjective mimic, however, can also be derived from the Greek *mimeisthai*. Mimicry and miming thus from the beginning must have referred to a purely active, conscious imitating of the play of facial features, body movements, deportment, and gestures. It is difficult to determine when the word mimicry also got the meaning of being a passive, unconscious reflection in look, facial expression, deportment, and gestures of thoughts, feelings and emotions, desires, and passions. It is quite certain, however, that such a relation between emotional condition and the various perceptual manifestations which were later called mimicry in the word's latter meaning must have been obvious to our first ancestors. In many ways, the imitative arts could illustrate that during classical antiquity one not only knew but was also fully familiar with all these circumstances.

Early attempts were made to evolve some system according to which people could be characterized and classified concerning type of physique. Probably the fundamental purpose of this was purely medical and not so

much either general-biological or artistic; it seemed possible to establish that those with a certain type of body were affected more easily than others by certain somatic illnesses. Thus, Hippocrates (the fourth century B.C.) distinguished between a *habitus apoplecticus* and a *habitus phthisicus*, from which come our terms apoplexy and phthisis (stroke and lung consumption). Rightly or otherwise, Hippocrates has also been referred to as the founder of the theory of the temperamental types, a theory based on the antique, so-called humoral-pathological concept of the four body fluids. Thus, the melancholy person was ruled by black bile, the sanguine by the blood, the choleric by yellow bile, and the phlegmatic by phlegm.

More or less influenced by this old, antique concept, numerous different typological classifications have since then been launched. Too much would be involved here to discuss these problems in detail, but the interesting characterological attempts made in connexion with the pedagogic debate during the sixteenth century with the object of discovering the inclination and aptitude of the pupils for higher studies must be mentioned.

During the past hundred years, a decisive attempt to evolve characterological systems that classify individuals with regard to both psyche and soma can be established. Among the nowadays best-known scholars in this field can be counted the German psychiatrist and neurologist Ernst Kretschmer (1888–1964). Based on the fine psychiatric observations and detailed descriptions of the mental diseases *manic-depression* and *schizophrenia* (*dementia praecox*) made by his fellow citizen Emil Kraepelin (1856–1926), Kretschmer presented his typology with, from the beginning, two and later four main types:

- 1 the leptosome type, somatically characterized by a slight and thin stature, long narrow face, and clear-cut nose; the type seems to correspond almost to Hippocrates' *habitus phthisicus*; its pronounced thin and lanky extreme variant is often described as *asthenic type*; mentally, the leptosome is characterized by a so-called *schizothymic* disposition, showing itself in, among other things, some paucity of ideas, some degree of emotional coldness combined with hypersensitiveness towards the surroundings, some difficulty in making contacts, and considerable capacity for abstractions; if the leptosome suffers mental disease, this is usually *schizophrenia* (from the Greek *schizein*, to split + *phren*, mind);
- 2 the pyknic type, characterized somatically by a thick stature, broad and low face, short neck, and a large, barrel-formed chest; mentally the pyknic type is characterized by a so-called *cyclothymic* disposition, showing itself in, among other things, an active intellect with lively thought activity, eagerness for work, and a warm and jovial nature; if the pyknic suffers mental disease, this is usually of *manic-depressive* character;

- 3 the athletic type, characterized somatically by a powerful, robust, and muscular stature; mentally, the athletic type is marked by a certain sluggishness in temperament (so-called viscous temperament);
- 4 the dysplastic type, which shows somatologically different individualities in stature that are incompatible with the three earlier-mentioned types and also lack relation with a certain mental disposition.

Among more recent and more important scholars of characterology, mention can be made of Kretschmer's pupil Klaus Conrad, the American psychologist William Sheldon, and the Swedish anatomist Bengt Lindegård. The Swedish psychiatrist Henrik Sjöbring also deserves special mention. The latter presented four constitution radicals for the appraisal of mental activity: capacity (intellectual ability), validity (mental energy), solidity (tenacity), and stability (ability to form energy-saving habits).

It cannot be denied that nowadays there are often decisive relations between, on one hand, physique (somatic constitution) and, on the other, mental personality type or mental character features (mental constitution). Kretschmer himself presumed that the relation was established in an internal secretory (endocrine) way. This theory seems reasonable: we know several internal secretory disturbances that affect especially the thyroid gland and the hypophysis, which result in both somatic and mental changes. However, it can be discussed whether also an endocrine disturbance is the basic reason for the type of serous intellectual deficiency, which is combined with so-called mongolism.

Attempts are made in Fig. 1 to illustrate schematically the facts and relations now discussed. The four circles represent mimicry, emotional conditions, somatic constitution, and mental constitution. Mimicry includes, among other things, the play of facial features, gestures, and posture. Of the amount of various emotional conditions, the diagram shows only sorrow, joy, and anger. As seen from the foregoing, different systems have been evolved for interpreting the somatic constitution. The diagram records Kretschmer's system, with its four somatic main types, as well as a number of the subfactors that usually are the object of appraisal in connexion with the somatic analysis, i.e. the anatomical shaping of the face, neck, trunk, and extremities. However, it can be added in parentheses that Lindegård in his system also works with other factors, e.g. the muscular strength and the skeletal sturdiness factor. When it concerns the mental constitution, different ideas about how it could be captured and analysed are naturally encountered in psychiatric literature. Kretschmer thus, as mentioned, spoke about schizothymic and cyclothymic disposition. The diagram includes Sjöbring's constitution radicals as being the four main pillars upon which the mental constitution, according to Sjöbring, rests.

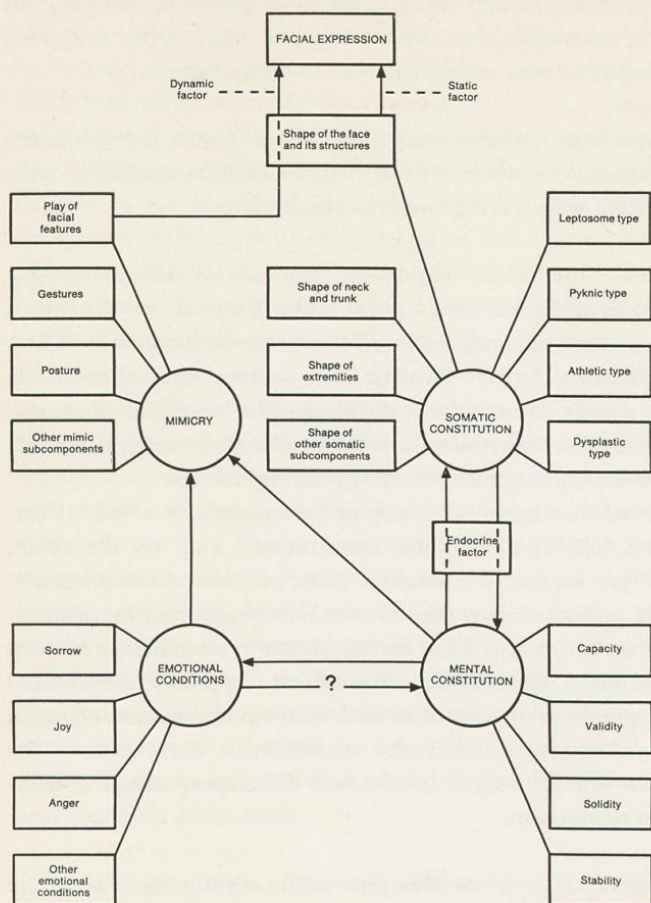


Fig. 1. Diagram showing the relations between facial expression, somatic constitution, mental constitution, mimicry, and emotional conditions.

Arrows in the diagram mark the relation that prevails between somatic constitution and mental constitution; the endocrine factor, which according to Kretschmer is responsible for this relation, is also indicated. The diagram also shows how the mimicry is affected by emotional conditions. The way the emotions are experienced is probably directly influenced by the mental constitution. Whether the opposite applies, i.e. whether often-experienced emotions of identical kind can also influence the mental constitution, is a matter that will only be hinted at here. The mental constitution, such as is disclosed in temperament and personal engagement, seems able to influence directly the mimicry. The inhabitants of southern countries are usually considerably more gesticulating and lively in their mimic play than those in northern countries. An exaggerated lively facial mimicry, a so-called hypermimia, can also occur at certain mental illness conditions, for instance schizophrenia. The opposite, a repressed mimicry, is often found with

endogenic depressions and also with certain conditions in the brain, among others, the so-called parkinsonism. Patients with this disease therefore often show wooden and dull expressions — mask faces — just as they also have a strongly repressed mimic co-movements (see below), a symptom which may be called paucity of movement.

The purely static facial expression is naturally primarily determined by the facial shape and the anatomical formation of the various soft parts and organs of the face. The extremely large variation here is so well known that examples would be superfluous. Later, in another context, however, we will return to the matter. It cannot be denied that the anatomical shaping can be so characteristic and impressive that it can give life to the appearance of the face, but the really living, dynamic, facial expression is produced by the play of features, i.e. the changes of the form and appearance of the facial soft parts — more or less rapidly appearing and thereafter disappearing — produced by the mimic musculature in the face. The facial soft parts are, as a matter of fact, the instrument that varies from person to person and upon which the mimic musculature plays a melody very similar for one and the same condition. If the same melody is played frequently, it leaves certain permanent reminiscences in the facial expression in the form of mimic wrinkles. More conspicuous permanent changes in the form of the various facial organs, however, cannot be produced by the mimic play. All these points will be treated in fuller detail later.

Against the background of what has now been indicated concerning partly the mimicry as a reflection of emotional conditions and partly the relation between soma and psyche, it is even more understandable if in a person's facial expression an attempt has been made also to read something about the characteristic traits and mental qualities of that person. The science concerned with this, called physiognomy (from the Greek *physis*, nature, shape + *gnomon*, a judge), evolved early during classical antiquity. Thus it is related that Pythagoras (*c.* 582—*c.* 507 B.C.) undertook a detailed physiognomic appraisal of everyone who wished to enrol as a pupil of his teaching. Aristotle (384—322 B.C.), however, is considered to be the one who first tried to systematize the physiognomic appraisal, which he also extended to apply to animals.

The first physiognomists do not appear to have had any particular interest in the changeability of the facial expression by the influence of mimicry. Primarily, the purely anatomical form of various facial parts, to which certain decisive characteristic qualities could be referred, was assessed. Thus one spoke about, for instance, the high intelligent forehead, the short stupid nose, and the weak, irresolute chin. Such concepts also made their marks on the creative arts, not only during the classical period, but far into our own days. Big eyes had a godlike quality, small mouths were a sign of chastity; therefore the masters consequently furnished their heroes and

heroines with eyes too large, and their madonnas with mouths small and childish.

During the Middle Ages, some flourishing of physiognomic activity took place, but not until the time of the Swiss physiognomist, priest, and author, Johan Kaspar Lavater (1741—1801) did physiognomy get a contemporary position as a "science". In his work "Physiognomische Fragmente zur Beförderung der Menschenkenntnis und Menschenliebe" (1775—1778) in which also the then young Goethe* was a co-worker, Lavater recorded his physiognomic observations. His attitude to the entire problem conformed largely to that of the classical physiognomists, which can perhaps best be illustrated by quoting some of his alleged relations: a large, open, square forehead = high intelligence; hooked roman nose = genius; snub nose = gaiety, recklessness, vanity; firm lips = firm character; soft lips = gentle and unstable character; black eyes = strength; blue eyes = meekness.

No matter how fantastic these pronouncements may appear, it must be admitted that Lavater touched upon the train of thought that Kretschmer so successfully developed much later, when he constructed his somatological system and in connexion thereto described the relations between soma and psyche.

The fundamental mistake that Lavater made was that in the main he divorced a certain facial shape from its somatological relation and correlated the anatomical form of this part not to a purely general mental disposition (which possibly had some justification) but to a distinctly indicated characteristic quality, as well as to an intellectual or mental quality. It cannot be disputed that Lavater, in his latter diagnosing, which unfortunately was also characterized by too far-reaching generalizations, was not only influenced by earlier prejudices, but also lent himself to free speculations and wishful thinking. One of Lavater's contemporaries, the German physician Franz Joseph Gall (1758—1828), the founder of phrenology, made a similar mistake. Gall believed that a relation existed between the conformation of the skull and the development of certain mental "brain organs" (according to Gall, no less than 27 different ones). By studying a person's skull, he thought he could determine the mental characteristics.

In the beginning, Lavater's theories were received with the greatest interest and enthusiasm, but it was not long before critical voices arose. The scientific investigation technique had by then developed further. Among more prominent scholars in this field, special mention can be made of the Scottish physiologist Charles Bell (1774—1842), the French anatomist Louis Pierre Gratiolet (1815—1865), and the French physician and physiologist Guillaume Benjamin Duchenne (de Boulogne, 1806—1875). The latter's investigations of the facial muscles and the mimic effects, which he also produced experimentally by local faradization, has even today a permanent

* Goethe has portrayed Lavater in "Dichtung und Wahrheit".

value. The great naturalist-scientist Charles Darwin (1809–1882) finally must also be mentioned. He tried to establish the principles that lie as basis for the mimic play in both man and animal. Darwin believed he had found that the expressions for sorrow are similar in all human races. This must also apply to numerous other emotional conditions, but the question concerning this is still not satisfactorily decided.

I Terms for indicating position and direction

To avoid misunderstandings at anatomical descriptions, special terms or designations have been created for indicating position and direction. Some of these are used in the following descriptions and discussions; they are therefore defined here.

The plane that divides face and head into a right half and a left half is called the median plane, as in the medical language (Fig. 2a). Each point that lies closer to this plane than any other point is said to be medially situated in relation to the latter point, which is laterally situated in relation to the former point. The inner corner of the eye, situated next to the nasal bridge, obviously lies closer to the median plane than does the outer corner of the eye, situated next to the temple. Thus the inner corner of the eye is the medial and the outer corner the lateral.

When indicating directions in the face, we consider the person to be standing upright (Fig. 2b & c; cf. also the direction indications on an ordinary compass). The main directions are therefore upwards, downwards, medially, and laterally to the right in the right half of the face, and laterally to the left in the left half of the face. Oblique directions in the right half of the face are medially-upwards, medially-downwards, laterally-upwards to the right, and laterally-downwards to the right; in the left half of the face, medially-upwards, medially-downwards, laterally-upwards to the left, and laterally-downwards to the left.

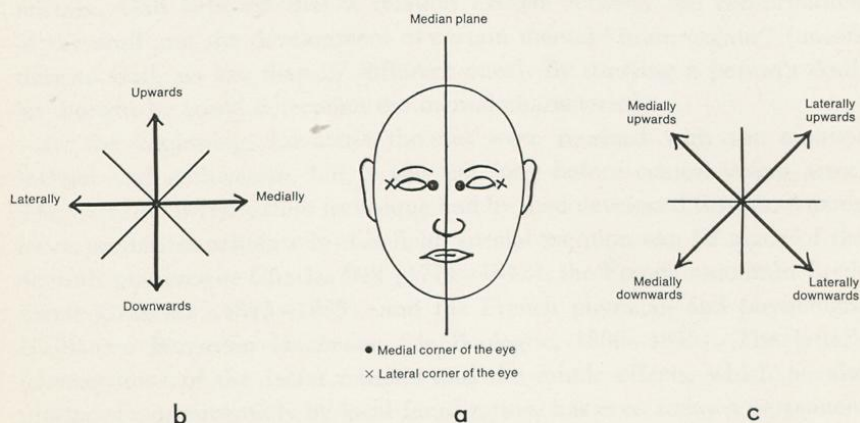


Fig. 2. Terms for indicating position and direction in the frontal picture of the face.

II The human cranium and the facial skeleton

Fundamental structure

The shape of a person's skull (cranium) influences to a considerable extent the impression given by the face. Because decisive and important relations exist between the facial soft parts and the skeletal basis upon which they rest, a short survey is given here of the fundamental structure of the cranium.

The cranium consists of two main parts (Fig. 3 & 4); a posterior upper part, which houses, among other things, the brain and is therefore called the brain cranium, and an anterior lower part, which forms the skeletal basis of the face and is therefore called the facial skeleton. It is this latter in particular, as well as the frontal bone (*os frontale*) belonging to the brain cranium, that is to some extent discussed here.

The frontal picture (Fig. 4), i.e. a skull seen from the front, shows uppermost the shovel-shaped, more or less arched part of the frontal bone, commonly referred to as the forehead. The nasal root is situated at the middle of the lower part, and from its lateral parts issue the right and the left supraorbital margin (*margo supraorbitalis*) in a somewhat curved course. These supraorbital margins form the lower edge of the forehead. From their lateral parts, an arched ridge formation rises upwards-backwards, which is the anterior boundary of the temporal area. Immediately above the root of the nose lies a part that plays an important role in anthropology, where it is referred to as glabella. This part, particularly in males, can be fairly strongly protruding. Parallel with and somewhat above the supraorbital margins run the superciliary arches (*arcus superciliares*) more or less well formed, but in the female often altogether missing. The reverse applies to the frontal bosses (*tubera frontalia*), situated somewhat higher up: these are usually better developed in women and children.

The lateral margin of the eye-socket (*orbita*) is formed by the zygomatic bone (*os zygomaticum*). In some people, this bone curves rather strongly laterally and is the skeletal basis for the cheekbone. Backwards, this bone is drawn out in a process which is included as the anterior part in the formation of the zygomatic arch below the temporal area. Sometimes, this

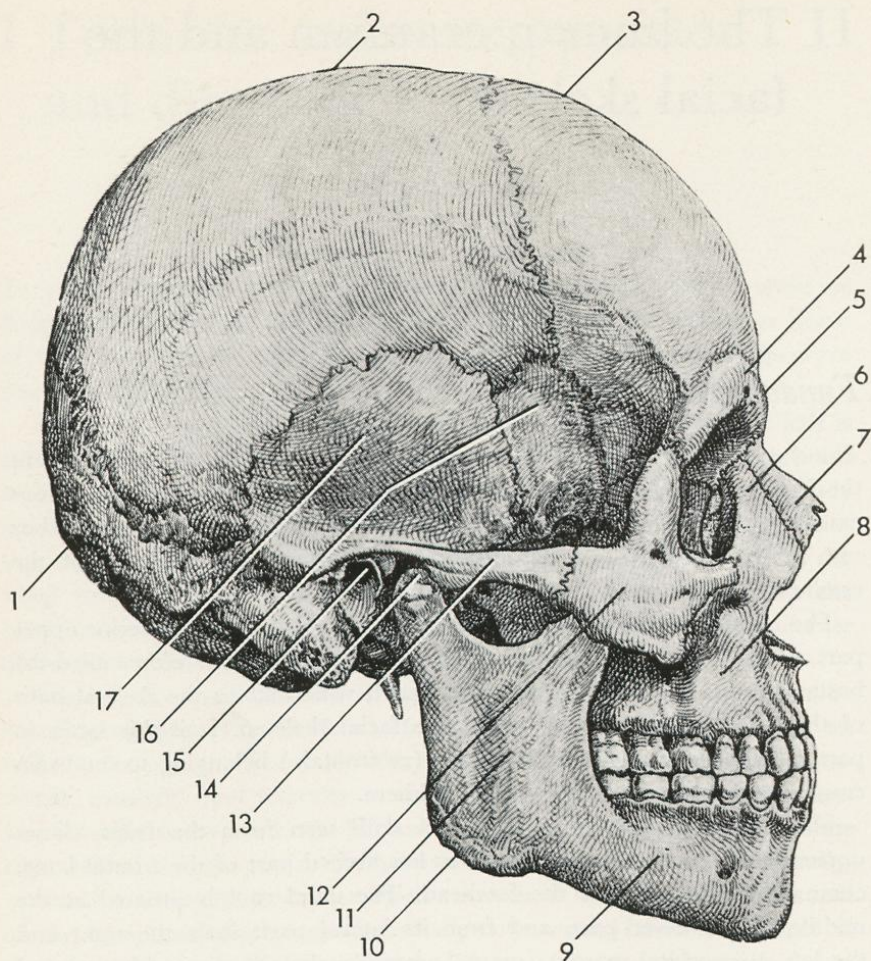


Fig. 3. Cranium, lateral view, profile picture (according to T. Petrén 1960).

- | | | |
|---|-----------------------|-------------------|
| 1 Occipital bone | 7 Nasal bone | 14 Jaw joint |
| 2 Parietal bone | 8 Upper jaw | 15 Auditory canal |
| 3 Frontal bone | 9 Body of lower jaw | 16 Temporal area |
| 4 Supraglabellar furrow | 10 Angle of lower jaw | 17 Temporal bone |
| 5 Glabella | 11 Ramus of lower jaw | |
| 6 Frontal bone process of the upper jawbone | 12 Zygomatic bone | |
| | 13 Zygomatic arch | |

zygomatic arch curves outwards or bends laterally. The zygomatic bone, however, also forms the lateral part of the infraorbital margin (margo infraorbitalis). The medial part of this margin, as well as the medial margin of the eye-socket, on the other hand, belongs to the upper jawbone (maxilla) and to the frontal process of this bone, which latter extends up to and combines with the frontal bone at the root of the nose.

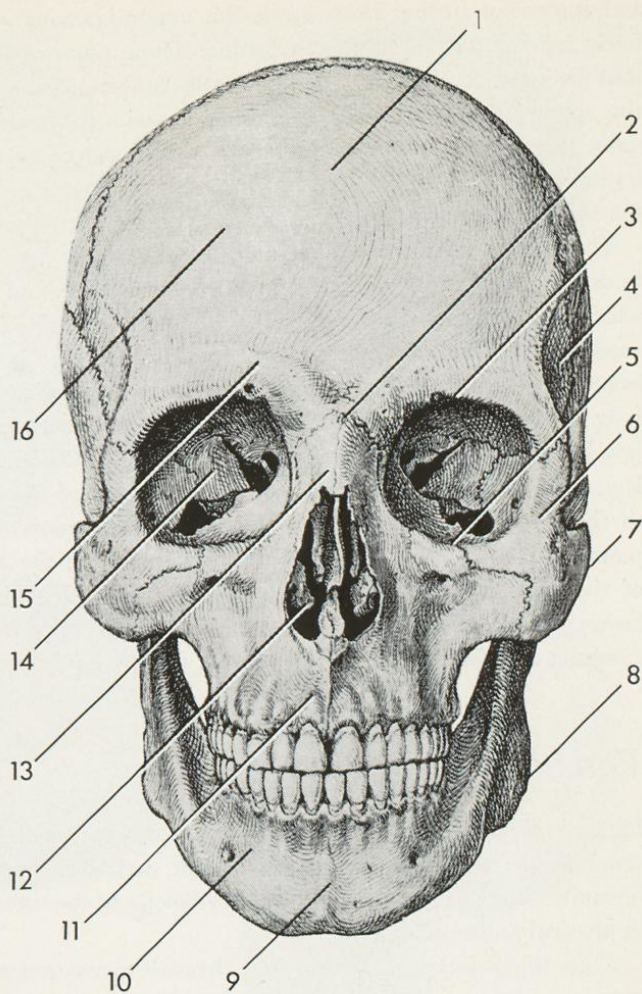


Fig. 4. Cranium, frontal view (according to T. Petrén 1960).

- | | | |
|-----------------------|----------------------|----------------------|
| 1 Frontal bone | 7 Zygomatic arch | 13 Nasal bone |
| 2 Root of nose | 8 Angle of lower jaw | 14 Eye-socket |
| 3 Supraorbital margin | 9 Chin boss | 15 Superciliary arch |
| 4 Temporal area | 10 Lower jaw | 16 Frontal boss |
| 5 Infraorbital margin | 11 Upper jaw | |
| 6 Zygomatic bone | 12 Nasal cavity | |

The upper jawbone is thus the bone that lies medially to the zygomatic bone. In the lower parts, the jawbones of both sides join, but higher up, there is a pear-shaped opening which reaches up to the root of the nose. This opening is the nasal cavity. In the upper part, it is closed by the two nasal bones, which join in the median line forming the nasal bridge. Immediately below the infraorbital margin lies the outlet of a nerve canal

and somewhat further downwards the upper jawbone sometimes shows a fairly marked hollow, the fossa canina. Those parts of the upper jawbone that lie on a level below the zygomatic bones and the nasal cavity form the upper jaw — in a limited meaning. Its width is barely half of that between the zygomatic arches. The teeth of the upper jaw are situated in the lower edge of the upper jaw and have their roots set into oblong cavities, the alveoli. These cause ridges (*juga alveolaria*) on the outside of the bone.

The frontal picture is completed by the lower jaw (*mandibula*). Its foremost part, in many persons, protrudes somewhat and forms a chin boss, which is sometimes distinctly cleft. Otherwise, each half of the lower jaw consists of two shanks, the branch (*ramus*) and the body (*corpus*). The branch is the upwards-standing shank in the posterior part of the lower jaw; highest up at the back, it carries the joint head, which is part of the jaw joint. The body is the anterior, more horizontally-standing shank of the lower jaw; in its upper part, it contains the teeth of the lower jaw. Similar to the teeth in the upper jaw, these have their roots set in alveoli. The posterior contour line of the branch together with the lower contour line of the body forms an angle of approximately 120° . That portion of the lower jaw where this angle formation is found is called the lower jaw angle (*angulus mandibulae*). In many persons, it is distinctly curved outwards.

Variations

Large individual variations due to age, sex, race, and hereditary factors, occur in the shape of the cranium. Such variations have for a long time been the object of profound study; they belong to the more central problems in physical anthropology.

Thus the object has been to find decisive measurements that produce a representative expression for various lengths, breadths, and heights, both in the cranium considered as a whole and in its two main parts: the brain cranium and the facial skeleton. So that the measurements of such dimensions could be consistently made in a standardized manner, special anthropological measurement points are referred to, whose position on the cranium are meticulously defined and internationally approved. Some measurements cannot be made until the cranium has been orientated in the Frankfort plane, which means that those points situated highest up at the external orifices of the auditory canals and the point that is situated lowest down on the left infraorbital margin must be found on the same horizontal plane.

Certain of the anthropological characters of the cranium can be determined directly without the necessity of referring to the obtained measurement results. In most cases, however, the anthropological characters are obtained with the aid of an anthropological index, which is usually based on two linear measurements expressed in percentage of each other. A

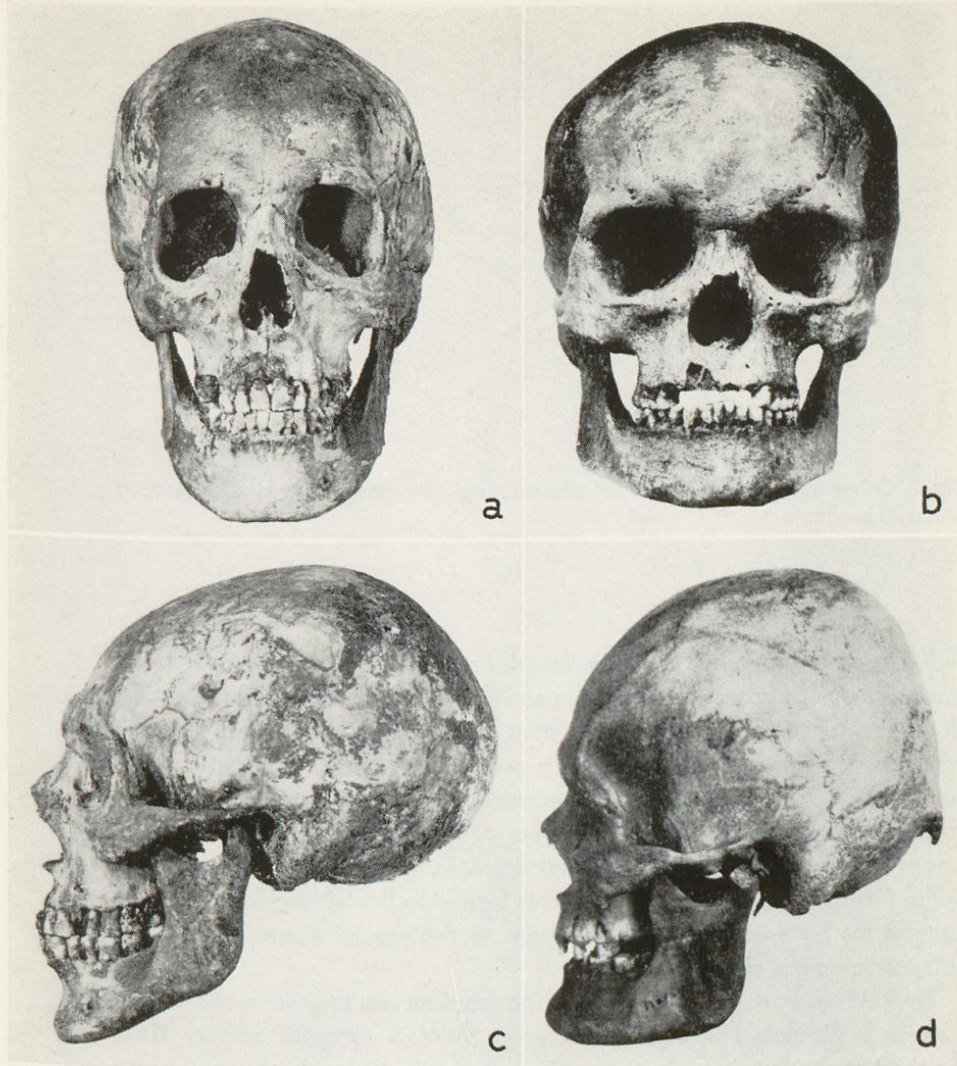


Fig. 5. Cranium of King Erik XIV of Sweden, sixteenth century: frontal picture (a), profile (c). Cranium of Gothland viking from the Iron Age: frontal picture (b). Cranium of Tibetan from East-Turkestan: profile (d). (According to N. G. Grejvall, C. H. Hjortsjö & T. Romanus 1962 (a, c), G. Retzius 1899 (b), and C. H. Hjortsjö & A. Walander 1942 (d).)

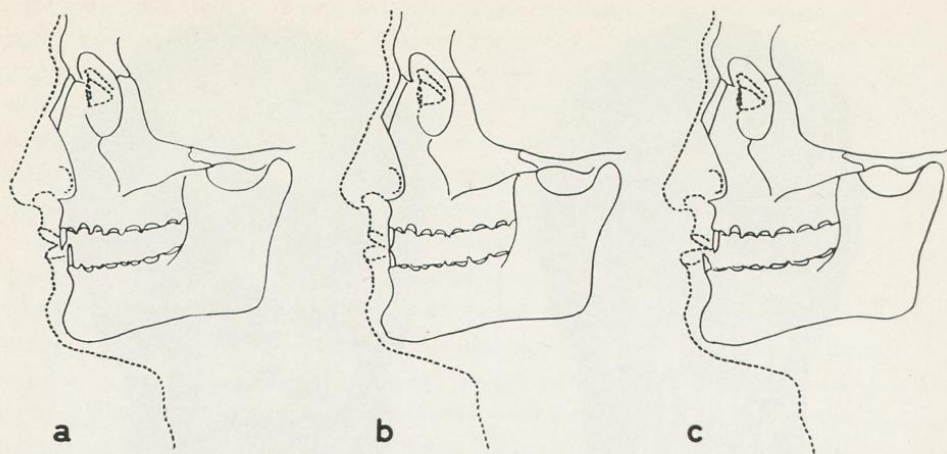


Fig. 6. Schematic drawing of normal bite (a), edge-to-edge bite (b), and underhung bite with prognia (c).

well-known example of this is the length-breadth index of the skull, introduced into anthropology as long ago as 1842 by the Swede Anders Retzius. With regard to the numerical value of this index, a distinction is made between dolichocephaly, mesocephaly, and brachycephaly. A large number of similar indices have during the course of time been constructed; it can be mentioned that the present author in his own anthropological investigations has usually worked with about 30 of these. However, it is unnecessary to delve further into these purely anthropological-technical questions; we will instead merely pause at some variations in the cranial shape that can in this concept be of special interest.

How different the general form of the cranium can appear in the frontal picture is illustrated in Fig. 5, where the Swedish sixteenth century King Erik XIV's skull (a), with its long face, is shown alongside the skull of an Iron Age viking from Gothland (b), with its low, broad face. The great variation in the profile picture is illustrated by Erik XIV's skull (c) alongside a Tibetan skull from Sven Hedin's East-Turkestan material (d). The fairly gracile structure and the longish shape of the former skull here contrast glaringly with the massive construction and the flattened back of the Tibetan skull.

When the teeth are clenched, the front teeth of the lower jaw normally sit somewhat behind those of the upper jaw (Fig. 6 a). If these teeth meet, there is an edge-to-edge bite (Fig. 6 b). Sometimes, however, the teeth of the lower jaw shoot in front of those of the upper jaw; we then have an underhung bite (Fig. 6 c). This variation in the shape of the jaw naturally presents a specially characteristic feature, not only to the facial skeleton,

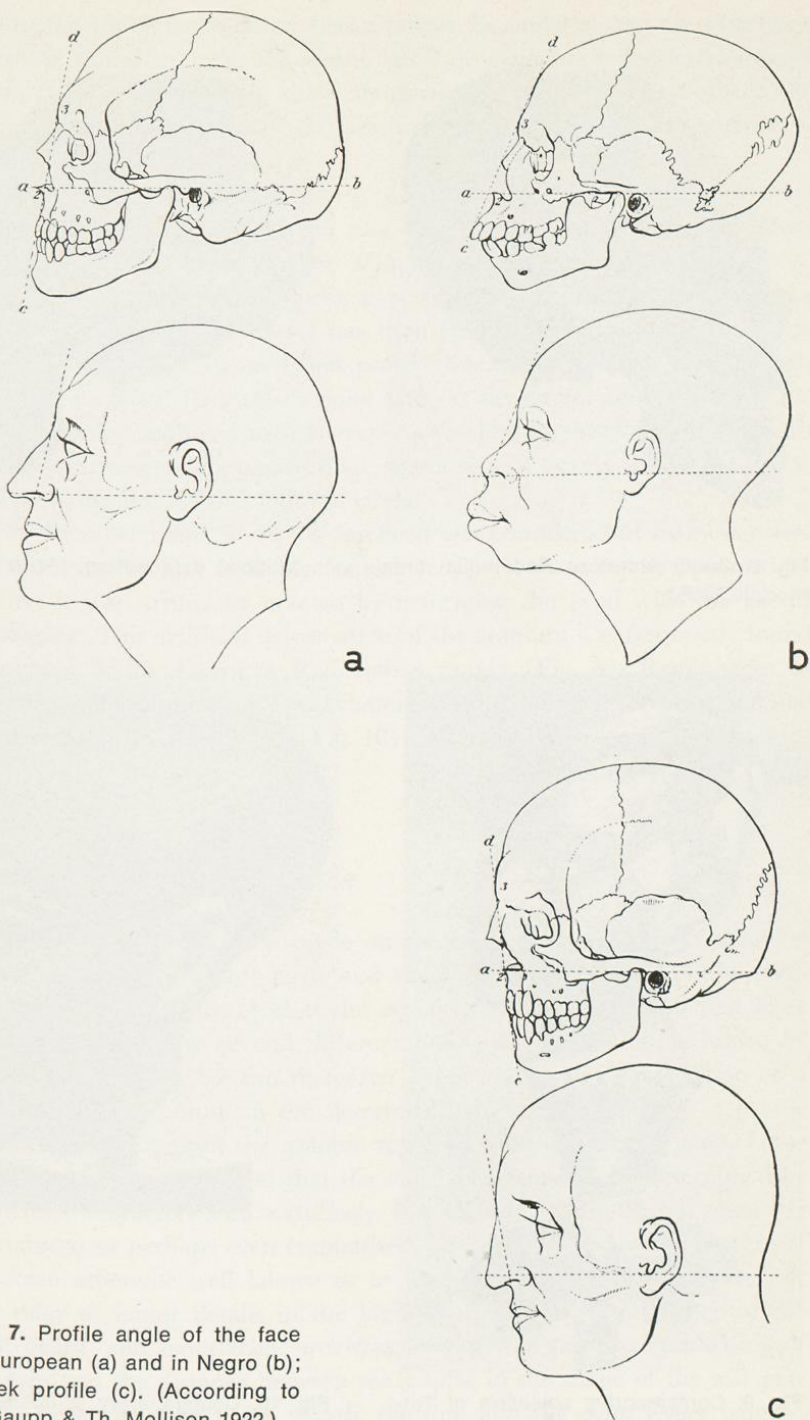


Fig. 7. Profile angle of the face in European (a) and in Negro (b); Greek profile (c). (According to E. Gaupp & Th. Mollison 1922.)



Fig. 8. South American Red Indian crania with artificial deformation. (According to C. H. Hjortsjö 1958.)



Fig. 9. Contemporary sculpture of Tutankhamen's deformed head as a child. (According to V. Laurent-Täckholm 1951.)



Fig. 10. Contemporary sculpture of deformed head of child, a daughter of Amenhotep IV. (According to Swedish encyclopedia, Vol. 8, 1948.)

but to the whole facial shape, because then the underlip and the chin often protrude rather strongly: the person has a progenia. This anomaly seems to be largely hereditary and was a dominant feature in, among others, the Habsburg dynasty, which Velázquez hints at in his well-known portrait of Philip IV of Spain.

The angle of the facial profile is also of particular interest. It is formed between a line drawn from the root of the nose to the most protruding lower part of the upper jaw and a line passing through the upper part of the auditory canal and the lowest part of the nasal cavity. The angle in a European is practically always less than 90° (Fig. 7 a) and in a Negro, even less (Fig. 7 b). In the Greek profile, the angle exceeds 90° (Fig. 7 c), although in actual fact, this is quite rare. As the name indicates, this angle of the profile, combined with a steeply ascending forehead and in line with it a straight descending nasal bridge, was a sign of beauty in ancient Hellas and probably also in other cultural circles.

On the other hand, a sloping forehead was considered in many quarters to be a beautiful and desirable feature. If a person was not so equipped by nature, it was artificially created by deforming the head with the use of bandaging. This artificial deformation of the cranium was frequently found in certain South American Red Indian crania (Fig. 8). Reminiscent of these are the sculptures of Tutankhamen's head as a child (Fig. 9) and one of Amenhotep IV's daughters (Fig. 10).

Cranium and appearance

Several attempts have been made on the basis of a cranium to obtain a plastic picture of the soft parts and thereby the appearance of the individual. It is possible to calculate the average thickness of the soft-part layer in various ways from several different points on the cranium. Guided by the obtained values, we can thereafter either "lay" some composition on a casting of the cranium in the determined thickness, or add to a profile picture of the cranium the graphic representation of the soft parts. However, we must bear in mind that the real facial features are determined by numerous subfactors and extremely fine details which, if not correctly reproduced or perhaps even emphasized, immediately distort the picture of a person otherwise well known to us and give it a foreign character. It can refer to minor details in the high forehead, or the character of the hair, beard, and moustache, eyebrows, eyelids, the position and setting of the eyes and the distance between the pupils, in the shape of the soft part of the nose, the cheeks, the mouth, the lips, and the chin. Every painter, artist, and photographer who works with portraits, and every actor are well versed with these conditions. A person who, after a long and wasting illness,

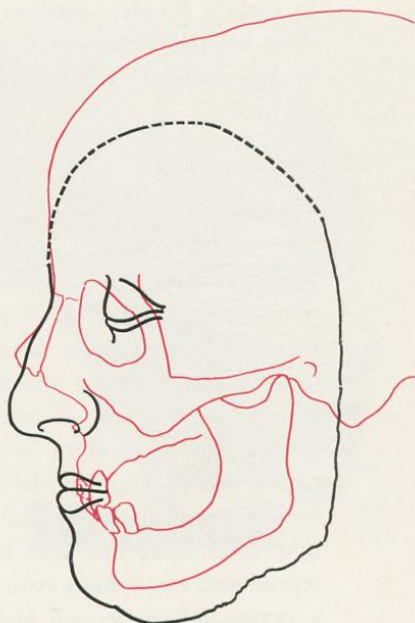
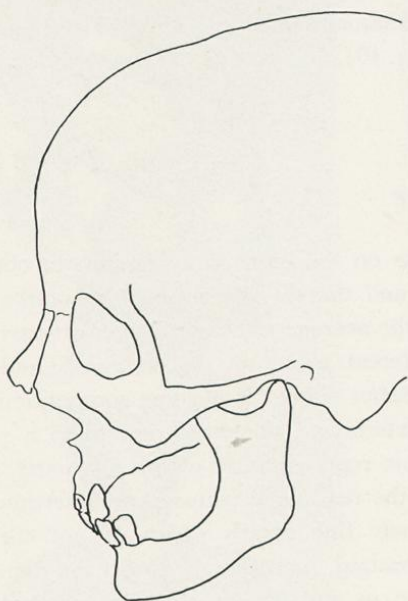
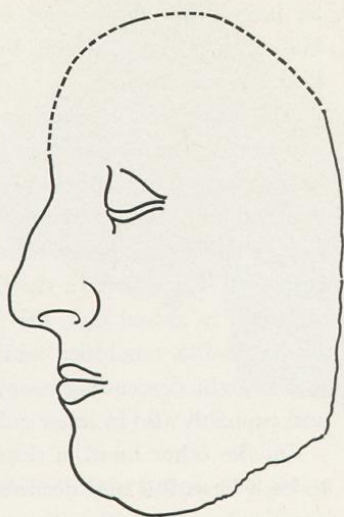


Fig. 11. Silver face mask of Queen Christina of Sweden, seventeenth century, (a, b, d) compared with a profile drawing of her cranium (c, d). (According to C. H. Hjortsjö 1967.)

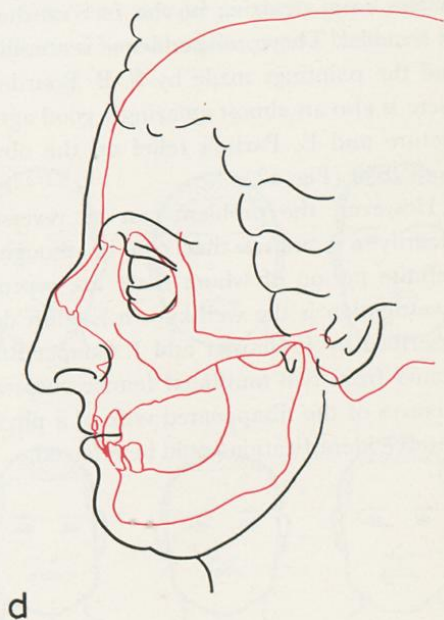
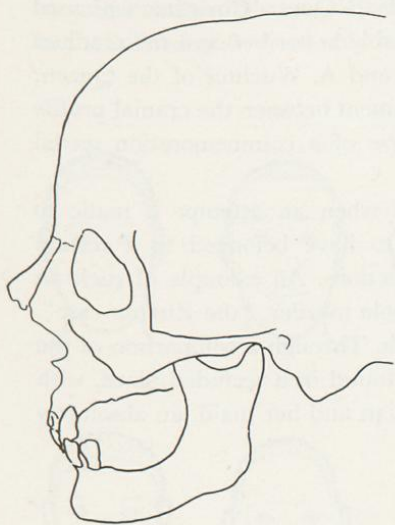
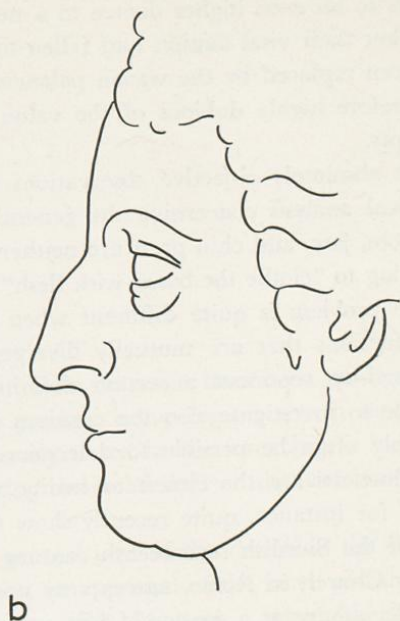


Fig. 12. Profile of Queen Christina on a commemoration medal (a, b, d) compared with a profile drawing of her cranium (c, d). (According to C. H. Hjortsjö 1967.)

lies in extremis often has something strange in his appearance. The same applies to an even higher degree to a newly-dead person when the tissues have lost their vital tension and fallen together and when the flush of life has been replaced by the waxen paleness of death. The author personally is therefore highly dubious of the value of the mentioned reconstruction attempts.

The absolutely objective observations that can be made by an anthropological analysis concerning the general shape of the face, its forehead, eye, nose, jaw, and chin parts are neither more reliable nor more complete by trying to "clothe the bones with flesh" by such reconstructions.

The problem is quite different when we have access to a number of reproductions that are mutually divergent, despite the fact that all are supposed to represent a certain definite person. If in such cases it is possible to investigate also the cranium of the person in question, it can probably often be possible to determine, at least reasonably well, which reproductions are the closest to reality and which are false. The author could, for instance, quite recently show that the silver mask covering the face of the Swedish seventeenth century Queen Christina, interred in St. Peter's Church in Rome, agrees very poorly with her cranium (Fig. 11). The deviations, as a matter of fact, are so great that it must be seriously questioned whether, on the whole, it represents a death mask, i.e. whether in this case a casting of the face of the dead Queen Christina was used as a model. The correspondence is considerably better between the cranium and the paintings made by S. B. Bourdon and A. Wuchter of the Queen; there is also an almost amazingly good agreement between the cranial profile picture and E. Parise's relief on the obverse of a commemoration medal from 1650 (Fig. 12).

However, the problem can be reversed when an attempt is made to identify a cranium that can be thought to have belonged to a certain definite person of whom there are reproductions. An example of such an investigation is the well-known English double murder, "the Ruxton case", described by J. Glaister and J. Couper Brash. Through a comparison of the crania from two mutilated female corpses, found in a secluded place, with pictures of the disappeared wife of a physician and her maid, an absolutely positive identification could be effected.

III The face

Facial form and details

Concerning the fundamental facial form, attempts have been made similar to the skeletal frontal picture to produce a typological system such as is shown here in Fig. 13. But as already stated in the foregoing, it is chiefly the shaping of the soft parts covering the facial skeleton that determines the appearance of the facial picture.

To enable the reader to get a general idea of the details in the shaping of the soft parts that are primary at an appraisal of the facial picture, they have here been reported in a tableau (Fig. 14) with a schematic drawing (Fig. 15). The details marked by * must be regarded as variable or produced by mimicry (see Chapter V). We return to several of these facial details in the following. It need only be observed here that the region bordered by

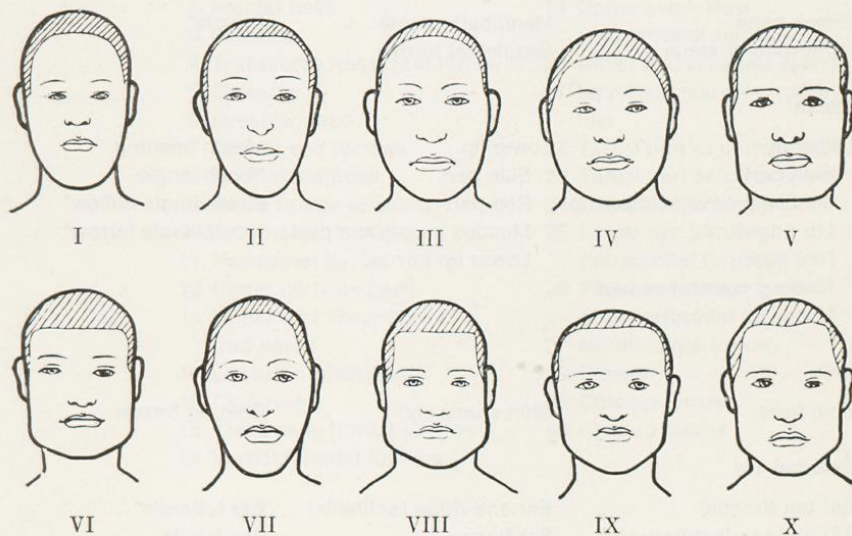


Fig. 13. Typological diagram for appraisal of facial form. (According to R. Martin 1928.)

Fig. 14. Table of facial details (cf. Fig. 15 and the special diagrams in Fig. 16, 20, 23, and 26.)

Forehead

Frontal boss*	Eyebrow	Vertical frontal furrows*
Glabella	Eyebrow head	Vertical frontal folds*
Supraglabellar furrow*	Transverse frontal furrows*	
Superciliary arch*	Eyebrow depression*	

Eyes

Upper eye furrow*	Lower eyelid	Medial corner of the eye
Lower eye furrow*	Tarsal part	Lacrimal caruncle
Upper eyelid	Lower eyelid furrow*	Semilunar fold
Cover fold	Lower eyelid margin	(Mongolian fold*)
Tarsal part	Lower eyelashes	Eyeball
Revelusion margin of cover fold	Palpebral fissure	White of the eye
Upper eyelid furrow*	Lateral corner of the eye	Iris
Upper eyelid margin	Lateral eye furrows*	Pupil
Upper eyelashes		

Nose

Nasal root	Posterior nasal wing furrow	Nasal bridge swellings*
Nasal bridge	Nasal wing margin	Transverse nasal root
Tip of the nose	Nostrils	furrows*
Nasal wing	Nasal septum	Transverse nasal bridge
Anterior nasal wing furrow	Nasal base	furrows*

Cheek

Cheek bone	Mandibular angle	Dimple*
Infraorbital triangle	Nasolabial furrow	

Mouth

Upper lip	Lower lip	Mouth opening
Skin part	Skin part	Mouth angle
Median groove of upper lip	Red part	Mouth angle hollow*
Lip ridge*	Mucous membrane part	Mouth angle furrow*
Red part	Lower lip furrow*	
Mucous membrane part		
Upper lip tubercle		

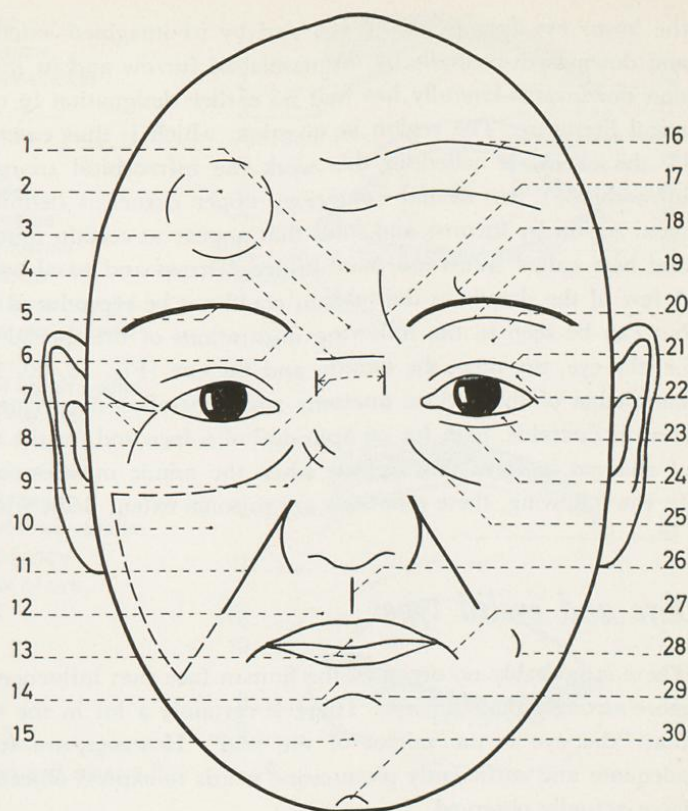
Chin

Chin boss	Chin concavity*	Chin-lip furrow
-----------	-----------------	-----------------

External ear

Ear tag (tragus)	Ear anti-ridge (antihelix)	Ear tubercle*
Ear anti-tag (antitragus)	Ear furrow	Ear lobule
Ear ridge (helix)	Ear cavity	

* Inconstant or temporary details produced by the mimicry



- | | |
|--------------------------------|--------------------------------|
| 1 Supraglabellar furrow | 16 Eyebrow depression |
| 2 Frontal boss | 17 Upper eye furrow |
| 3 Glabella | 18 (supraorbital furrow) |
| 4 Transverse nasal root furrow | 19 Cover fold of upper eyelid |
| 5 Eyebrow | 20 Revulsion margin of cover |
| 6 Eyebrow head | 21 fold |
| 7 Lateral eye furrows | 22 Tarsal part of upper eyelid |
| 8 Root of the nose | 23 Tarsal part of lower eyelid |
| 9 Nasal bridge swellings | 24 Lower eyelid furrow |
| 10 Infraorbital triangle | 25 Lower eye furrow |
| 11 Nasolabial furrow | 26 (infraorbital furrow) |
| 12 Upper lip (skin part) | 27 Philtrum (median groove |
| 13 Upper and lower lips | 28 of upper lip) |
| 14 Lower lip (skin part) | 29 Mouth angle furrow |
| 15 Chin boss | 30 Dimple |
| 16 Transverse frontal furrows | 29 Chin-lip furrow |
| 17 Vertical frontal furrows | 30 Chin concavity |

Fig. 15. Schematic frontal diagram of the face with facial details.

the lower eye furrow at the top and by its imagined extension laterally, and downwards-medially by the nasolabial furrow and its imagined extension downwards-laterally has had no earlier designation in current anatomical literature. The region in question, which is thus extended forwards by the cheek, is called in this work the infraorbital triangle (*trigonum infraorbitale*). Its medial (anterior) upper corner is delimited from the nasal region by furrows and folds that appear at certain mimic expressions and here called transverse nasal-bridge furrows and nasal-bridge swellings. A few of the details in the tableau could not be reproduced schematically, but can be seen in the following illustrations of the special facial organs, i.e. the eye, the nose, the mouth, and the ear (Fig. 16, 20, 23, 26). Some knowledge of the surface anatomy and most-often occurring variations in form is desirable, both for an appraisal of a face and for the understanding of changes in form that appear when the mimic muscles come into play. In the following, these questions are to some extent dealt with.

Eye and eyelid types

There is probably no organ in the human face that influences the observer more strongly than the eye. There is certainly a lot in the old expression that "the eye is the mirror of the soul". However, we frequently lack adequate and sufficiently picturesque words to express objectively what we have actually observed.

Fig. 16 a shows an open eye with its upper and lower eyelid (cf. also Fig. 14 & 15). The broken line also outlines projectively the margin of the eye-socket, which is described in connexion with the account of the facial skeleton. Often, larger or smaller portions of the upper and lower margins are also indicated in the soft parts by furrows, called the upper and the lower eye furrow (*sulcus supraorbitalis* and *sulcus infraorbitalis*). As Fig. 15 shows, the upper part of the upper eyelid has been called cover fold. This has a lower free revulsion margin. The lower part of the upper eyelid, which in the open eye is seen only as a more or less narrow margin below the revulsion margin of the cover fold, is called the tarsal part. A crescent-shaped fibrous lamina or tarsus is found inside it (cf. Fig. 17). The lower free edge of the tarsal part which borders the palpebral fissure is, of course, the upper eyelid margin. It carries the eyelashes. The lower eyelid is similarly constructed. However, we do not speak here of a cover fold; we refer instead to a narrow, crescent-shaped tarsal part delimited downwards from the remaining part of the lower eyelid by a merely indicated lower eyelid furrow. The free edge of the tarsal part, the lower eyelid margin, borders the palpebral fissure downwards and — similar to the upper eyelid margin — carries eyelashes. As shown in Fig. 17, the upper tarsus is considerably higher than the lower.

- 1 Eyebrow head
- 2 Upper eye furrow
- 3 Contour of eye-socket (broken line)
- 4 Iris
- 5 White of eye
- 6 Semilunar fold
- 7 Lacrimal caruncle
- 8 Lower eyelid furrow
- 9 Lower eye furrow
- 10 Cover fold of upper eyelid
- 11 Revulsion margin of cover fold
- 12 Tarsal part of upper eyelid
- 13 Upper eyelid margin
- 14 Pupil
- 15 Lateral corner of eye
- 16 Lower eyelid margin
- 17 Tarsal part of lower eyelid
- 18 Upper eyelid furrow
- 19 Medial corner of eye
- 20 Lower eyelid

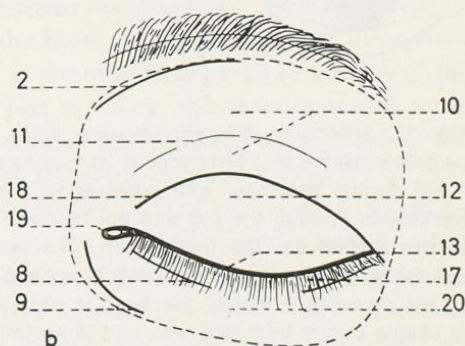
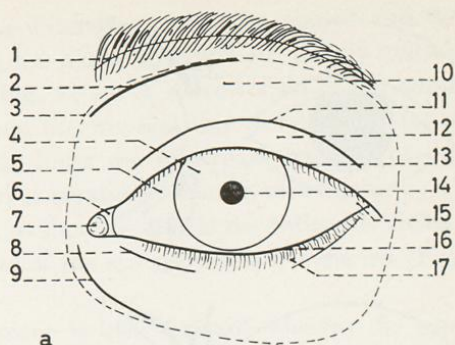


Fig. 16. Schematic diagram of left eye, open (a) and closed (b).

A more or less rich amount of fatty tissue is found in the cover fold of the upper eyelid; the entire tissue here, as in the lower eyelid, is throughout loose. Both eyelids also have a special musculature — we return to this later in connexion with the discussion of the mimic musculature.

When the eye is closed at blinking, the upper tarsal part falls down like a blind in front of the eyeball. Not until then is the tarsal part of the upper eyelid completely visible with the fine furrow, the upper eyelid furrow, which delimits the tarsal part upwards (Fig. 16 b). When, at blinking, the eye is again opened, the upper tarsal part is raised with the aid of a special muscle, the levator, which is attached to its upper margin, indicated in Fig. 17 by a broken-line arrow.

As described in the foregoing, the palpebral fissure is bordered upwards and downwards by the upper and the lower eyelid margin, respectively. The arch shaped curve of the upper margin is somewhat more accentuated than that of the lower margin. The edges meet laterally at an acute angle and form the lateral corner of the eye. At the medial corner of the eye, however, the palpebral fissure shows a slight inlet, the lacrimal lake. A

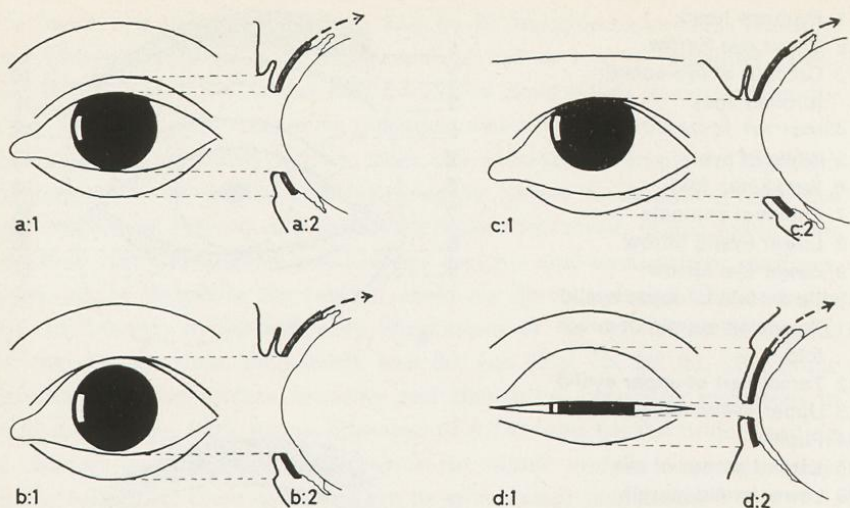


Fig. 17. Schematic diagram showing those changes in the appearance of the palpebral fissure that can occur at various head postures. The diagrams designated 1 are frontal sketches, with designation 2 are vertical sections from the front-backwards through the eye and the eyelids. The parts with heavy black markings in the eyelids are the tarsal parts. The levator muscle of the upper eyelid is indicated by an arrow. The gaze is supposed to be consistently directed forwards. In the sketches a and b, the head is oriented in the Frankfort horizontal plane, in sketch c, it is bent forwards, and in sketch d, bent backwards (see also text).

granule, about the size of a hemp seed, the lacrimal caruncle, and a small crescent-shaped mucosal fold (*plica semilunaris*) are found here. However, in persons belonging to the Mongolian race, the medial corner of the eye has its special formulation (see below).

The eyeball is situated in the eye-socket (*orbita*). Its anterior pole contains the transparent, hour-glass-shaped cornea, through which the iris is visible. The colour of the iris varies from blue to brown, with several different nuances as intermediary colours. The centre of the iris is furnished with a black hole, the pupil, through which light rays penetrate; its size varies similar to the diaphragm ("the iris diaphragm") of a camera. If the pupil in certain light appears to be not black but grey, the reason is usually grey cataract in the eyelens situated behind the pupil. This part of the eyeball with cornea, iris, and pupil—important to us—is here, for the sake of simplicity, called merely iris. Peripherally of the iris (thus really peripherally of the cornea) we find the fibrous membrane of the eyeball (*sclera*) covered by the conjunctiva. Its white lustrous character is responsible for the expression: the white of the eye.

When the head is placed in the Frankfort plane (see above) and the eyes are directed straight forward, the iris in a normal eye usually touches the margin of the lower eyelid (Fig. 17 a). A narrow strip of the white of the eye might be visible between the iris and this margin. The tarsal part of the upper eyelid, however, hides the uppermost segment of the iris. At powerful tension of the earlier-mentioned levator muscle, this tarsal part can be raised a trifle further, so that not only is the entire iris visible, but also a narrow strip of the white of the eye appears above the iris (Fig. 17 b).

If the head in the Frankfort plane is bent forward whereas the eyes remain directed forwards, the following occurs. Similar to the head, the eyeball undergoes a change in position in the orbita. However, the orientation of the eyeball is not changed: the eye remains directed forwards. In relation to the other parts of the head, the anterior pole of the eyeball can be said to be turned upwards at the same time as the tarsal part of the upper eyelid is somewhat raised. Just as before, this tarsal part will cover the upper part of the iris. The strip of the white of the eye below the iris, however, becomes considerably increased in breadth (Fig. 17 c).

If the head in the Frankfort plane is, instead, bent backwards whereas the gaze remains directed forwards, a change in position of the eyeball — but not in orientation — occurs similar to the foregoing. In relation to the other parts of the head, however, the anterior pole of the eyeball can now be said to be turned downwards so that the lower eyelid will cover an increasingly larger part of the iris. Precisely as in a "sleeping doll", the tarsal part of the upper eyelid follows this downward turning of the eyeball. In connexion with this, the palpebral fissure narrows increasingly and finally closes, at the same time as the tarsal part of the upper eyelid reaches the lower eyelid (Fig. 17 d).

We will return in the following to the changes that otherwise occur concerning the appearance of the palpebral fissure and the eyelids in connexion with activity in the mimic musculature.

With respect to the position of the eye in the face, a distinction can be made between the superficially and the deep lying eye, but naturally, all conceivable intermediate forms occur between these two types. But it must be noted that the cover fold at the superficially lying eye has a more vertical position and is therefore fully visible when the eye is seen from the front (Fig. 18 a) whereas in a deep-lying eye, it has an almost horizontal position and is therefore hardly seen when looked at from the front (Fig. 18 b). In persons belonging to the Mongolian race, the eye is most often lying superficially (Fig. 18 c). But in these persons, the medial corner of the eye has quite a special formulation: the upper eyelid margin here most often combines at an acute angle with the lower eyelid margin, forming the so-called Mongolian fold or epicanthus, which from the front hides the lacrimal lake.

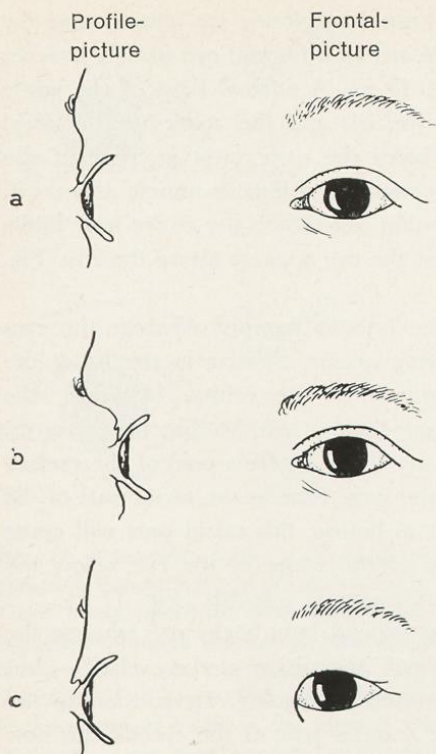


Fig. 18. Schematic diagram showing normally lying eye (a), deeply lying eye (b), and Mongolian eye (c).

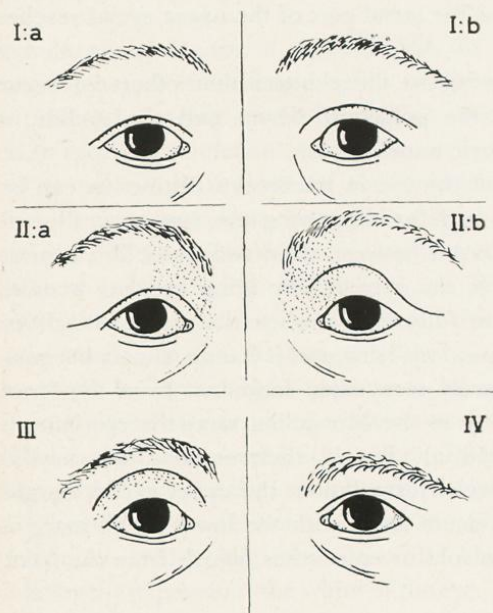


Fig. 19. Schematic diagram of different types of eyelids. The diagram is based on the description given by F. Lange.

Numerous different types of upper eyelids exist, and the author has tried to illustrate, in a simple drawing, the most important (Fig. 19). Here, the ideas of the German physician F. Lange are mainly used as basis. Type I is a fairly high and well-filled cover fold of uniform breadth, with either a narrow tarsal part as in type I a of the figure, or a somewhat higher tarsal part as in type I b. In type II, the cover fold in its medial part has lost most of its fatty tissue and has therefore sunk inwards, whereas its lateral part has a more abundant fatty tissue and therefore curves forwards in the form of a thickening. This type also has a variant, with a low (type II a) and a somewhat higher (type II b) tarsal part. Type III is dominated by a very high tarsal part and a relatively narrow or low cover fold. In type IV, the entire upper eyelid is very low; therefore the eyebrow will be very close to the palpebral fissure. In a front-view portrait, however, it can often be almost impossible to determine whether this type IV is actually present or whether it is only simulated by a deep-lying eye.

Nose and nasal types

In connexion with the description of the facial skeleton, the two nasal bones at the upper part of the pear-shaped nasal cavity were mentioned. The shape of these bones influences also the form of the upper part of the nasal bridge. Below the nasal bones, however, there is a nasal skeleton constructed of a number of smaller cartilaginous plates. The nasal skeleton together with the covering soft-part layer determines the form of the other part of the nose (see Fig. 20). The basic shape of the nose has for long been compared to an irregular three-sided pyramid. It has three free surfaces: the lower surface with the two nostrils (nares) and the two side surfaces. The pyramid is attached to the face through its basal surface. The

Fig. 20. Schematic diagram of the nose and its various details.

- | | |
|-------------------------------------|--------------------------------|
| 1 Glabella | 6 Tip of the nose |
| 2 Root of the nose | 7 Nostril and nasal septum |
| 3 Nasal bridge (bony part) | 8 Nasal base |
| 4 Nasal bridge (cartilaginous part) | 9 Nasal wing |
| 5 Anterior nasal wing furrow | 10 Posterior nasal wing furrow |

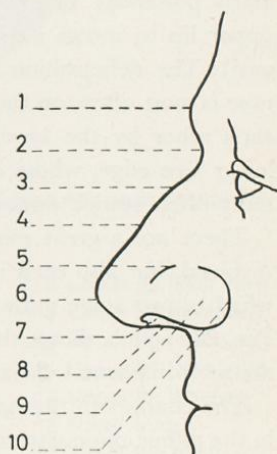




Fig. 21. Variations in the lower nasal surface with the nostrils (according to A. Rauber & Fr. Kopsch 1936.)

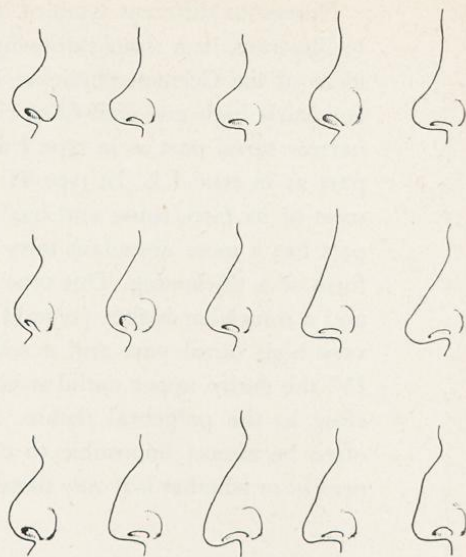


Fig. 22. Typological diagram for judging nasal type (according to R. Martin 1928).

lateral surfaces are combined in the median plane to a nasal bridge (*dorsum nasi*) whose lower part merges into the tip of the nose (*apex nasi*). At the top, the nasal bridge, as well as the lateral surfaces, terminates at the nasal root (*radix nasi*). Furthest down on each lateral surface, a small rounded, or beanlike, swelling — the nasal wing (*ala nasi*) — is found, delimited from the side surface by a shallow furrow, the anterior nasal wing furrow (*sulcus alaris*). A deeper and sharper posterior nasal wing furrow (*sulcus alaris posterior*) delimits the nasal wing backwards towards cheek and upper lip to merge into the lower free margin of the nasal wing (*margo nasi*). The delimitation of the nasal wing forwards towards the tip of the nose is most often, on the other hand, blunt. The nostrils are separated from each other by the lowest part of the nasal partition (*septum nasi*). Its lower free edge, whose contour in profile is called nasal base (*basis nasi*), most often stands somewhat lower than the nasal wing margin.

There are a great many nasal shapes: not only are general proportions involved, but also each individual detail. This is illustrated here in Fig. 21, which shows some variations of the lower surface with the nostrils, and in Fig. 22, which shows the German anthropologist R. Martin's diagram of the most important variations of the nasal profile.

The changes in the nasal shape that occur in connexion with the activity in the mimic musculature are discussed later.

Mouth and lip types

Few words are usually devoted to the lips and their structure in the ordinary anatomical textbooks. The lips, however, are quite complicated with their system of different muscle fibres. But the structure makes it possible for the mouth opening and the lips, more than any other facial organs, to change appearance and form. Later, we return more fully to this matter; at this point, a limited information about the external anatomy of the lips, as well as a short survey of certain lip types, is given.

In both the upper lip and the lower lip, three different parts can be distinguished: the skin part, which fundamentally has the same character as the cheek and the chin; the soft structure that lacks hairs and is red in colour; the redder mucous membrane, hardly visible when the mouth is closed (not shown in Fig. 23). In rare instances, the borderline between

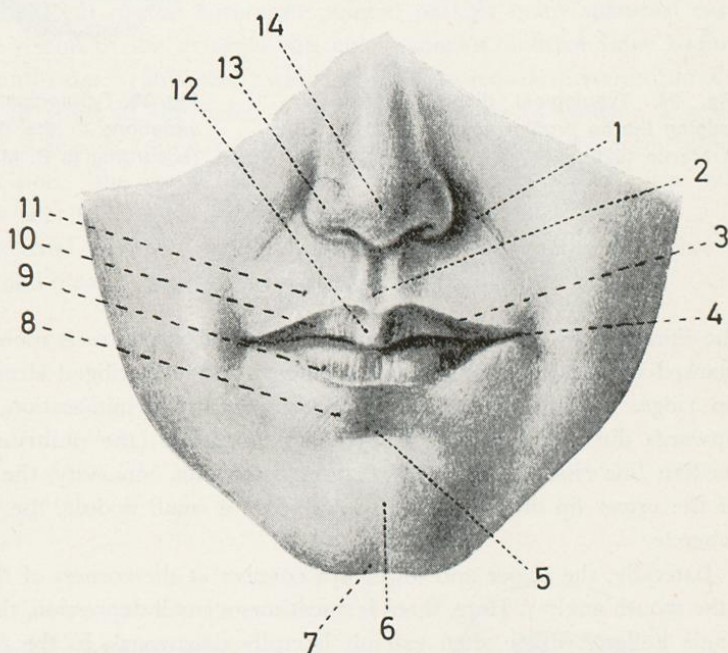


Fig. 23. Lower part of the face with its various soft parts (according to A. Rauber & Fr. Kopsch 1936).

- | | |
|---------------------------------------|--------------------------|
| 1 Nasolabial furrow | 8 Lower lip (skin part) |
| 2 Philtrum (median groove, upper lip) | 9 Lower lip (red part) |
| 3 Lip ridge | 10 Upper lip (red part) |
| 4 Mouth angle | 11 Upper lip (skin part) |
| 5 Chin-lip furrow | 12 Upper lip tubercle |
| 6 Chin boss | 13 Nasal wing |
| 7 Chin concavity | 14 Tip of the nose |

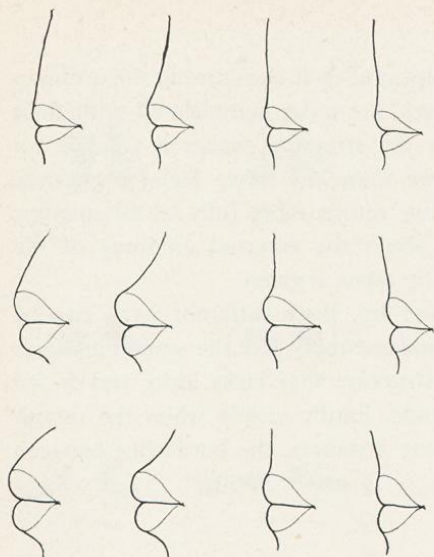


Fig. 24. Typological diagram for judging the lip profile (according to R. Martin 1928).

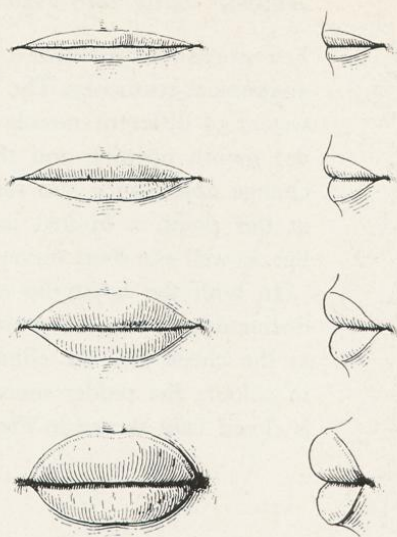


Fig. 25. Typological diagram for judging variations in the thickness of the lips (according to R. Martin 1928).

the skin part of the upper lip and the soft red structure is more strongly marked by the presence of a very narrow and thin ridged structure, the lip ridge. The mentioned borderline shows, in its mid-section, a weak, upwards directed concavity from which a groove (the philtrum) at the median line rises to the nasal septum. Below this concavity, the soft part of the upper lip often has in its lower part a small nodule, the upper lip tubercle.

Laterally, the upper and lower lips connect at the corners of the mouth (the mouth angles). Here, there is sometimes a small depression, the mouth-angle hollow, which often extends laterally downwards in the form of a small furrow, the mouth-angle furrow (*sulcus labiomarginalis*).

The appraisal of the skin contour of the upper lip in the profile picture, when the head is oriented in the Frankfort plane, plays a definite role in connexion with anthropological investigations. The mentioned German anthropologist R. Martin has created a diagram for the purpose (see Fig. 24) in which the position, height, and curve of the contour is considered. He has made up a similar diagram for the appraisal of the thickness of the lips (see Fig. 25). The two diagrams beautifully illustrate the great variation in form and need little or no comment.

Ear

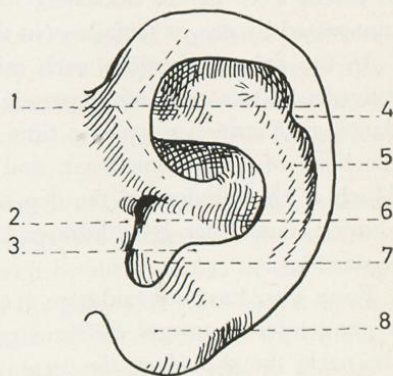
The anatomy of the ear will be briefly touched upon, limited to the external ear (*auricula*).

The skeleton of the external ear consists of a cartilaginous plate covered with skin (see Fig. 26). The general shape is egglike with the smaller end downwards. At about the middle of the anterior part of the ear, there is a small tonguelike protrusion, "the ear tag" (*tragus*), and immediately behind this, a hollow, "the ear cavity" (*concha*). In its anterior part, the external auditory canal begins and leads into the inner ear. From the upper part of the hollow and above the auditory canal, a ridge-shaped structure (*helix*) starts, which then runs — like a rolled hatbrim — round the anterior, the upper, and finally, the posterior edge of ear and ends about level with the auditory canal. At the posterior upper part of this ridge, there is sometimes a slight swelling, the ear tubercle (*tuberculum Darwini*), which is thought to be reminiscent of the outermost pointed part of many mammal ears. From the region of the external ear, above *concha*, another ridge begins, "the ear anti-ridge" (*antihelix*), which runs backwards-downwards, parallel with but in front of the *helix*. At the lower border of *concha*, a small protrusion is found, "the ear anti-tag" (*antitragus*), separated from *tragus* by an incision, "the ear furrow" (*incisura intertragica*). The lower part of the ear is called the ear lobule (*lobulus auriculae*).

The external ear has certain small muscles, which are rudimentary, however, and have no practical importance for man.

Fig. 26. Diagram of the left external ear.

- 1 Ear ridge (*helix*)
- 2 Ear tag (*tragus*)
- 3 Ear anti-tag (*antitragus*)
- 4 Ear tubercle
- 5 Ear anti-ridge (*antihelix*)
- 6 Ear cavity
- 7 Ear furrow
- 8 Ear lobule



IV »Mimic co-movements«

When the medical student speaks of "the mimic musculature" or when this is treated in the textbook literature, a quite special musculature innervated by a special nerve (the 7th cranial nerve, *nervus facialis*) is referred to. It belongs to the group "the muscles of the head" and is mainly situated in the face. Such a limited use of the term "mimic musculature", however, is strictly speaking faulty. Thus the Introduction and the there described diagram have already revealed that the concept "mimicry" includes, besides the play of facial features, a series of other expressive movements in the form of those gestures, posture, and carriage which often highly characteristically mark our appearance and behaviour. These expressive movements represent a manifestation of one or other prevailing emotional condition that is noticeable in our personal appearance. The reader is referred to what is mentioned in the Introduction about the individually varying intensity and liveliness of these movements.

All the various muscles in our body that are responsible for the mentioned activity are naturally mimic muscles in the real meaning of the term. The limited use mentioned above regarding the term mimic musculature, however, is so old that it is hardly possible to produce any change in the meaning of the term because of the risk of misunderstanding. Therefore the expressive movements that occur along with the play of facial features cannot be described as "mimic movements". On the other hand, they could tentatively be called "mimic co-movements". They will be referred to briefly here before discussing the facial mimic musculature — i.e. that innervated by *nervus facialis* — in the next chapter.

In the animal kingdom, such mimic co-movements probably often play a dominant role as mimic expressive means. We need only call to mind the dancing of cranes at pairing time, the curved back and bristling hair on the back of a frightened cat, and the capers of the newly-released colt. Much of the mimicry of the dog lies in the tail, whether this wags in joy and satisfaction or is withdrawn between the hind legs in sorrow and a sense of loss.

From what has been said here, it can be seen that the mimic co-movements in man refer to several different parts of the body. They engage not least the neck, the shoulders, the arms, and the hands. However, here mention

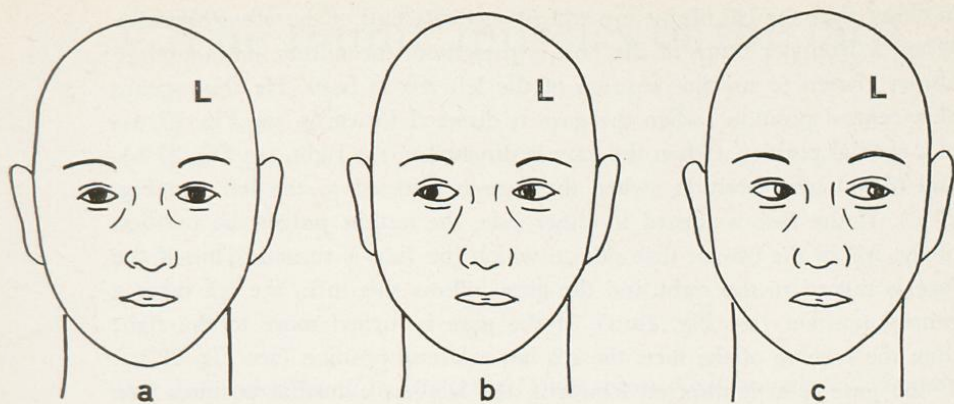


Fig. 27. Schematic presentation of the position of the iris (frontal view of face, see text).

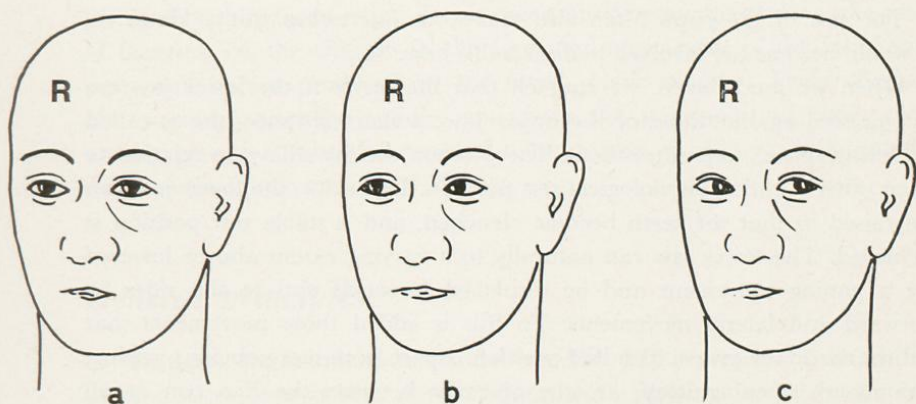


Fig. 28. Schematic presentation of the position of the iris with the face turned (see text).

will be made only of those co-movements that are of special importance for our discussions, because often they very effectively supplement the play of facial features caused by the mimic musculature. All these co-movements are thus produced by muscles innervated in a way other than by *nervus facialis*.

The dilatation of the palpebral fissure in contrast to the normal, caused by action of the eyelid levator, has been described earlier. But the position of the eyeball itself, such as this is disclosed by the situation of the iris in the palpebral fissure, is also interesting. If the gaze is directed forwards, the iris is situated approximately in the centre of the fissure in the frontal picture of the face. But if without turning the head the gaze is directed

to either side, the iris of one eye will sit medially and of the other laterally. When a frontal picture of the face is presented, the author has therefore always chosen to use the position of the left iris as basis. He thus speaks of a central position (when the gaze is directed forwards, see Fig. 27 a), of a medial position (when the gaze is directed to the right, see Fig. 27 b), and of a lateral position (when the gaze is directed to the left, see Fig. 27 c). If the face is turned to either side, the author judges the position of the iris in the eye on that side to which the face is turned. Thus if the face is turned to the right and the gaze follows this turn, the iris takes a central position (see Fig. 28 a). If the gaze is turned more to the right than the turning of the face, the iris has a lateral position (see Fig. 28 b). If the gaze is kept directed forwards, the iris has a medial position (see Fig. 28 c). Even in the simple figures shown now, a certain mimicry appears — as can be observed. The iris can also have an upward turned position or a downward turned position (“downcast look”).

The size of the pupil often also makes an interesting study. However, it would become too involved to discuss this here.

When we are relaxed, we can tell that the teeth of the lower jaw are not pressed against those of the upper jaw: a short distance, the so-called “freeway space”, separates them. The position the jaws have in relation to each other is called physiological rest position. From this, the lower jaw can be raised so that the teeth become clenched, and a stable rest position is achieved. The lower jaw can naturally to a varying extent also be lowered by a gaping movement and be displaced forwards and to the sides by forward and lateral movements. To this is added those movements that return the lower jaw to its initial position. Apart from more obvious gaping, the mouth opening itself, i.e. the aperture between the lips, can at all movements remain closed although it need not. On the other hand, the mouth opening, with the teeth clenched, can also have a considerable width.

If the head in the Frankfort plane is considered the initial position, the following head movements can be made: forwards bending, backwards bending, lateral bending, and lateral turning, and the return movements to the initial position. Both the forwards bending and the backwards bending can be combined with the lateral turning to the left or to the right. The lateral bending can also be combined with the lateral turning, either in the same direction as the lateral bending or in the opposite direction.

V The mimic muscles of the face

The description given in Chapter III has shown how strongly individually varying can the anatomical shape of the facial soft parts and organs be. It was also pointed out in the Introduction that this anatomical shaping can be so effective that it can give life to the appearance. But the really living, dynamic, facial expression is determined by another factor: the play of features, i.e. the changes in the form and appearance of the facial soft parts and organs produced by the facial mimic muscles. These changes often occur extremely rapidly, and from the standpoint of time, they usually precede the spoken word. In the present work, we will primarily dwell on the mimic muscles of the face.

General principles

In the main, the mimic musculature (see Fig. 29) is arranged around the facial orifices (eye-sockets, nasal cavity, mouth opening, and the auditory canals) in the form of circular running muscle fibres, which at contraction act constricting on the opening in question. In anatomy, this type of muscle is called sphincter. Other muscle fibres radiate from the surroundings towards the opening and at contraction can produce an expanding or pulling of the opening in the direction of each muscle. These muscles are anatomically known as dilators (or dilators).

The mentioned changes in shape are made possible by the mimic muscles never having both origin and attachment on the skeletal basis. Both origin and attachment are either situated in the soft parts or the origin is on the skeletal basis and the attachment in the soft parts. The origin is to be regarded as more or less fixed, whereas the attachment at the contraction of the muscle moves towards the origin.

Most mimic muscles exercise their main effect on a certain organ structure. Most beautiful is the above-described muscle arrangement around the mouth opening. In man, this is the only facial orifice where the functional principles of the mimic musculature is fully retained. They have largely become lost at the other orifices. This refers particularly to the ears, which

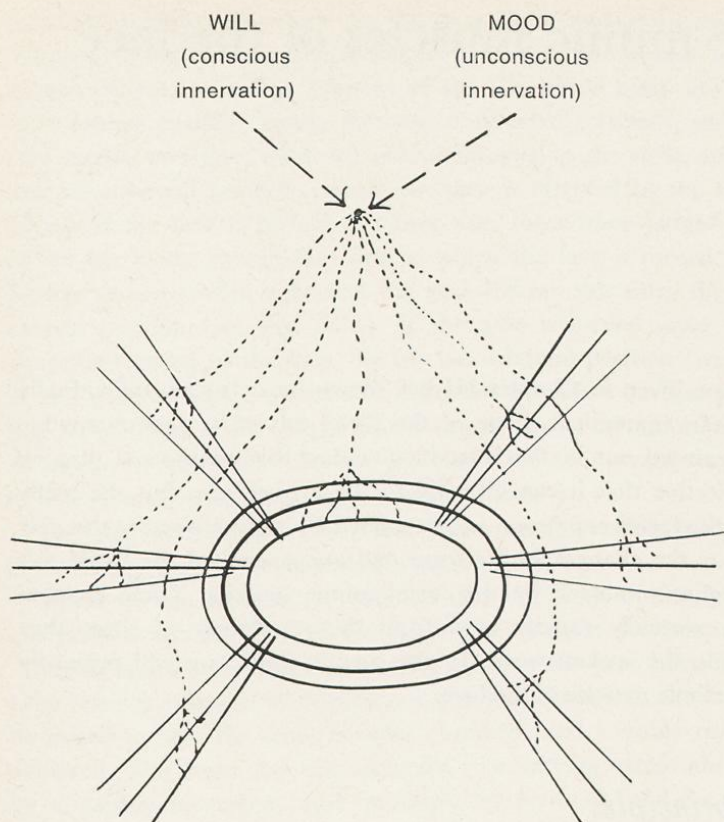


Fig. 29. Schematic presentation of the fundamental arrangement of the mimic musculature around an organ opening in the face.

can neither be constricted nor be expanded, and the nasal opening where the ability to constrict and to expand is extremely limited. The palpebral fissure can be constricted, but only insignificantly expanded.

Some mimic muscles, however, lack direct relation to any organ orifice in the face because they, instead, attach superficially in the skin, either at the place of an existing skin furrow (for instance, the nasolabial furrow; see above, Fig. 15) or at some other place. At their contraction, such muscles pull the skin region in question in direction towards their origin, whereby the possible skin furrow is deepened, displaced, or changed in form. Small skin depressions or skin hollows (cf. below, "the dimple") can also appear at the muscle's attachment in the skin. However, the soft parts situated between the muscle's origin and attachment are also affected. They can be pressed together, bulging, furrowed, folded, or displaced in their entirety. If the latter occurs, soft part regions can also be affected in

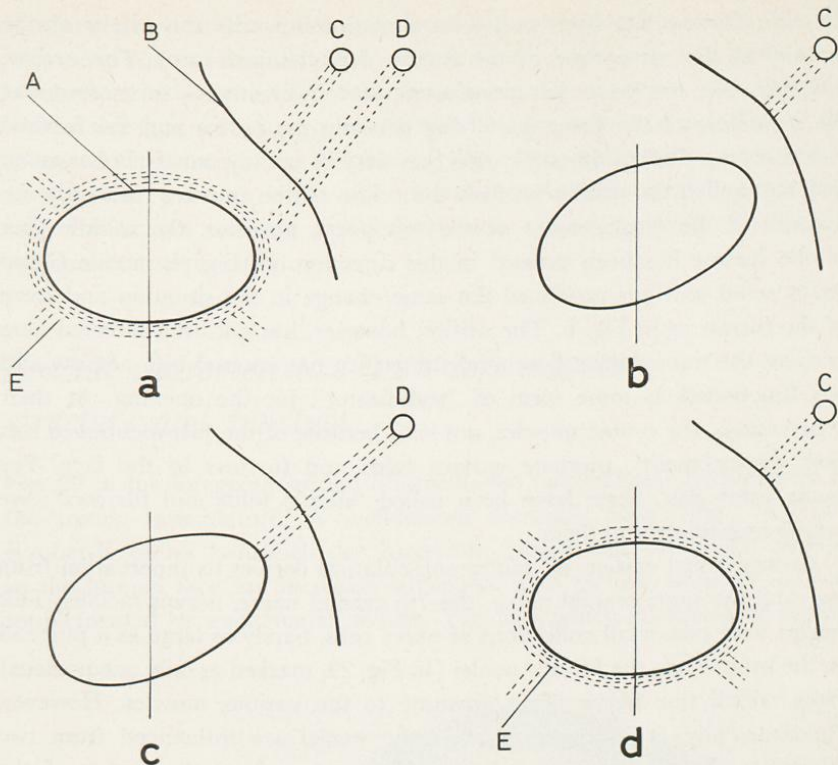


Fig. 30. Schematic presentation of a mimic muscle play (see text).

various ways in the surroundings. Both stretchings and compressings with further changes caused by these can appear. Such soft part displacements play an extremely important role as side effects of the direct muscle effects, but strangely, these have earlier hardly attracted any attention. With the aid of a schematic drawing, a muscle play is shown here, as it has fundamental interest for future analyses.

In Fig. 30 a, A is an orifice and B a skin furrow. The orifice is surrounded by musculature E, consisting of a sphincter and a few indicated dilators. A muscle C runs from its origin (marked with a circle) in direction towards the orifice, but does not reach this; instead, it attaches itself in the skin furrow. Another muscle D runs parallel to C, but passes the skin furrow without attaching itself in this and reaches the orifice, where it attaches itself. This muscle D is thus one of the real dilators of the orifice. In Fig. b, only muscle C has acted, with the result that the middle part of

the skin furrow has been pulled in direction towards the origin of the muscle, at the same time as the furrow has changed form. The orifice, however, has not been left unaffected, but indirectly — on account of the stretching of the tissue part lying between the orifice and the furrows — has been pulled in the same direction. In Fig. c, only muscle D has acted and has pulled the orifice towards the origin of the muscle. Indirectly, on account of the displacement of the soft parts, however, the middle part of the furrow has been pressed in this direction. In Fig. d, muscle C has again acted and has produced the same change in the situation and form of the furrow as in Fig. b. The orifice, however, has not been affected here because the musculature E around the orifice has entered into activity and has functioned as some form of "stabilizator" for the opening. At their contractions, the mimic muscles, not least because of the just-mentioned soft part displacements, produce various folds and furrows in the face. For many years past, these have been called "mimic folds and furrows"; we return immediately to them.

As mentioned earlier, all mimic musculature derives its innervation from one and the same cranial nerve, the 7th cranial nerve, *nervus facialis*. This begins with two small collections of nerve cells, barely as large as a pinhead in the brain stem, the *facialis nuclei* (in Fig. 29, marked as only one nucleus) from which fine nerve fibres emanate to the various muscles. However, fundamentally, it is important that the nuclei are influenced from two directions. Partly, they are influenced by nerves from the cortex of the brain, wherein the conscious nerve impulses originate. It is thus possible, for instance, consciously to shape the mouth in various ways and to mime different facial expressions. Partly, the nuclei are influenced by different mental centres where the emotions are experienced. The slightest change of mood therefore characterizes purely automatically and unconsciously the mimicry, unless we consciously — i.e. by an act of will — try to check and break the emotionally produced impulses. This matter concerning the influence of various emotional conditions on the mimicry, however, has already been discussed in the Introduction.*

When the innervation of the muscles ends — whether this occurs consciously or unconsciously — the muscle contractions also end and the thereby produced mimic expression disappears. In children and youths, the furrows and folds created by the play of facial features also fade away and become smoothed out owing to the general elasticity of the skin in younger ages. But the older the person becomes, the more these qualities of the skin are lost. To this is added certain tissue replacements at the places of the furrows and folds. Their tendency to remain therefore becomes increasingly obvious with the passage of time. To the extent that a certain

* The neuro-anatomical basis of emotional life has been analysed in detail by the Swede Folke Löfgren (1961, 1967).

mimicry, which can have been produced by a certain mood, has particularly often marked a face, the folds and furrows created by the mimicry in question, which tend to become increasingly permanent, can therefore endow the face with an expression that is a reminiscence or reflex of the mood which is most often dominating. This fact, well known to all prominent portrait painters, is naturally of the greatest importance in connexion with the artist's difficult and delicate task of endeavouring to obtain a personality interpretation.

Special characteristics with reference to structure and function

Fig. 29 in the foregoing section illustrates the fundamental arrangement of the mimic musculature. A well-known textbook plate (Fig. 31, from Rauber-Kopsch's *Lehrbuch der Anatomie*) shows how the mimic muscles in the human face are in reality arranged. This picture, however, will be supplemented by a schematic picture (Fig. 32), which illustrates the course

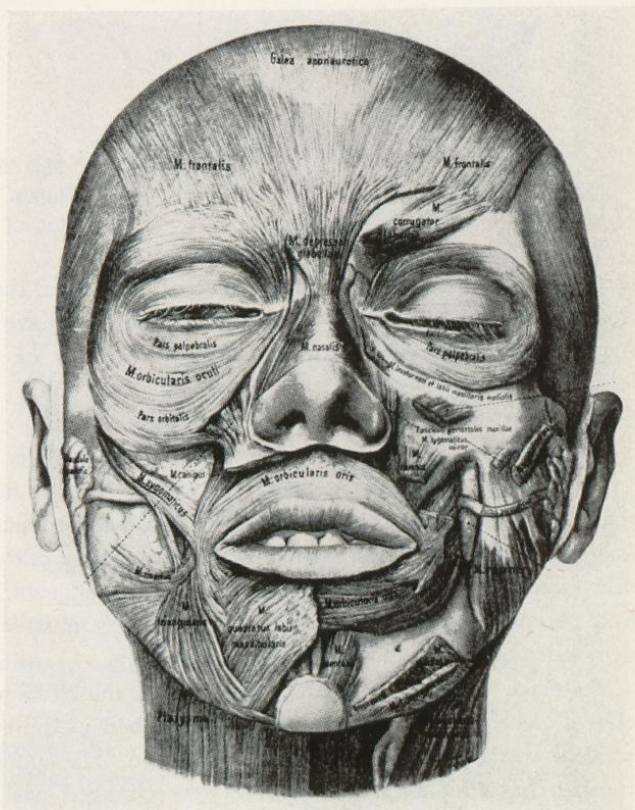


Fig. 31. The mimic muscles of the face (according to A. Rauber & Fr. Kopsch 1955).

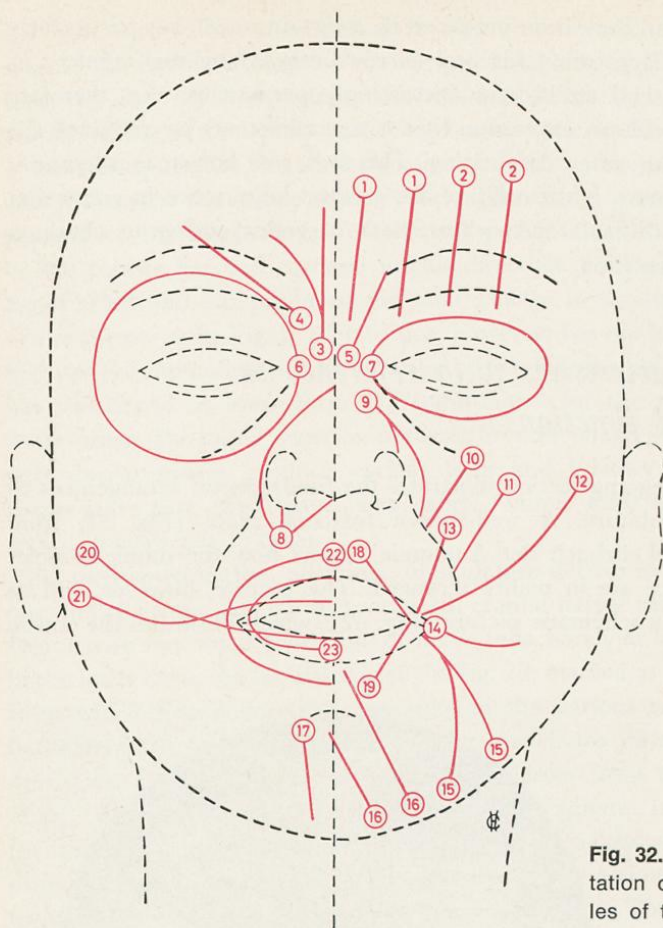


Fig. 32. Schematic presentation of the mimic muscles of the face.

of the various muscles (in red). The small circles on the drawing indicate the more or less fixed points where the muscles have their origin. The figure within each circle agrees with the number of the muscle in the following survey.

Most anatomical textbooks usually present a group classification of the mimic muscles. For instance, they mention the muscles of the roof of the skull, of the eye, of the nose, of the mouth, and of the external ear. In the following, the author has deliberately abandoned such or similar classification, because at the mimic analysis, the recording of the above-mentioned side effects is often as important as the knowledge of the main function and main effect of a muscle on a certain organ structure. This will be demonstrated in numerous ways in the following.

To make the matter clearer, the various muscle functions and muscle effects of each individual muscle are described in the text under the anatomical structures and regions they refer to. The names of the different muscles have on several occasions been changed and unfortunately not

always for the better. Below, the most usual names are used, but to avoid misunderstanding and for the use of the expert, the Latin names are put in parentheses. (The abbreviation "m" means musculus.) A few mimic muscles (among others, the platysma, the lacrimal part of the sphincter muscle of the eye, the muscle of the neck, m. occipitalis, and the muscles of the external ear) will not be discussed as they lack interest in the present context. It must also be borne in mind that considerable individual — both anatomical and functional — variations exist. For instance, some of the muscle contractions that certain persons are able to perform cannot be done by others. Therefore, what follows must be understood with some reservation and interpreted as an attempt to describe both positively known and in most persons at least theoretically conceivable muscle functions and muscle effects.

The author readily admits that the problem he was faced with was rather difficult when the formulation of the task had reached this stage. How could a written account of the muscle functions and muscle effects be illustrated to make them clear and photogenic to the reader? The question was particularly justified, because the primary objective of the entire muscle analysis was to try to develop a certain system of "mimic letters".

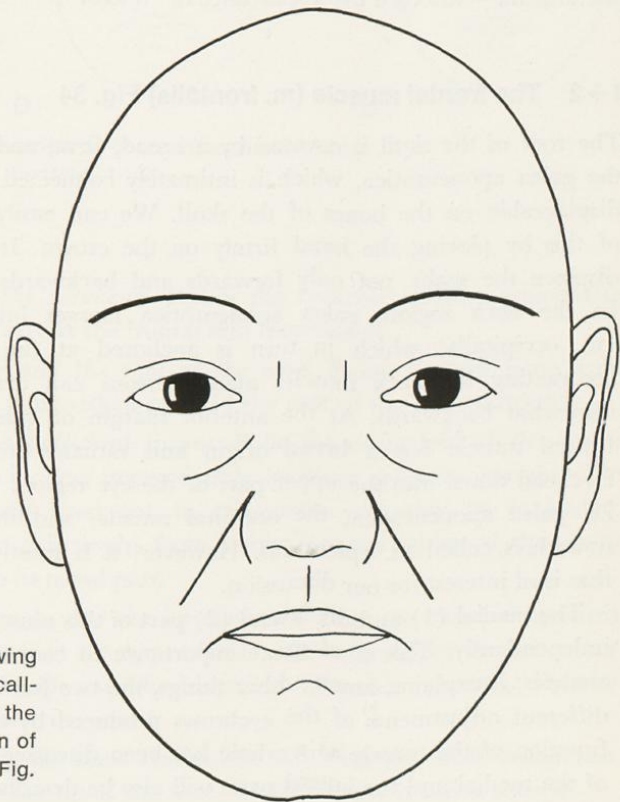


Fig. 33. Schematic drawing of frontal view of face, called "Victor", which is the basis of the presentation of the muscle effects in Fig. 34–39.

After much and varied experimenting, the author decided to consistently base his schematic illustrations on one and the same frontal picture of the face, whereon only more important facial details were marked. This picture (see Fig. 33) has in all the following discussions been called "Victor"; as can be seen, it is a simplification of that earlier shown in Fig. 15 (cf. also the table in Fig. 14).

At the description of the various muscles in the following, reference will be made to these figures:

Fig. 34 (muscles No. 1—2);

Fig. 35 (muscles No. 3—7);

Fig. 36 (muscles No. 8—10);

Fig. 37 (muscles No. 11—15);

Fig. 38 (muscles No. 16—19);

Fig. 39 (muscles No. 20—23).

Each of these figures contains pictures designated a and b. One a-picture is identical with "Victor". The details affected by the muscle involved are indicated by a broken line. No other violence has been carried out on "Victor", if we ignore the changes produced by the muscle marked in red. Each b-picture shows how these changes — if they occurred as isolated phenomena — affected the appearance of "Victor".

1+2 The frontal muscle (*m. frontalis*) Fig. 34

The roof of the skull is covered by a broad, firm, and sinewy membrane, the galea aponeurotica, which is intimately connected with the scalp, but displaceable on the bones of the skull. We can easily convince ourselves of this by placing the hand firmly on the crown. It is then possible to displace the scalp, not only forwards and backwards, but also sideways. In the neck region, galea aponeurotica merges into the neck muscle (*m. occipitalis*) which in turn is anchored at the occipital bone. By contracting the neck muscle, many persons can draw the entire scalp somewhat backwards. At the anterior margin of galea aponeurotica, the frontal muscle has a broad origin and radiates from there across the forehead down into the upper part of the eye region. The entire structure, i.e. galea aponeurotica, the occipital muscle, and the frontal muscle, is nowadays called *m. epicranii*. However, it is mostly the frontal muscle that is of interest for our discussion.

The medial (1) and the lateral (2) part of this muscle can work relatively independently. This is of great importance in connexion with the mimic analysis; it explains, among other things, the two fundamentally completely different adjustments of the eyebrows produced by the muscle. After the function of the muscle as a whole has been discussed, the special function of the medial and the lateral parts will also be described.

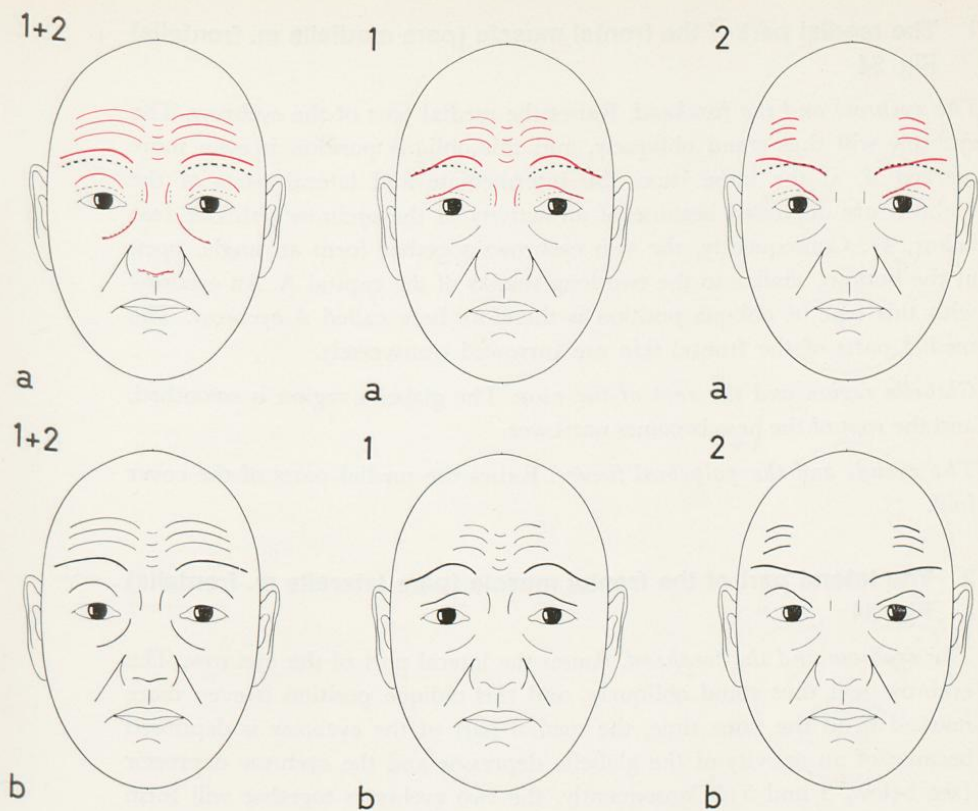


Fig. 34. Schematic presentation of the effect produced by the frontal muscle (m. frontalis, 1+2):

the medial part, 1:

the lateral part, 2.

The eyebrow and the forehead. Raises the eyebrow without appreciably changing its form. Furrows the frontal skin transversely.

The glabella region and the root of the nose. Raises the soft parts here. The glabella region is smoothed out and the root of the nose narrows.

The eyelids and the palpebral fissure. Pulls the cover fold of the upper eyelid upwards and renders imperceptible its lower revulsion margin. The palpebral fissure itself need not, in connexion with this, be expanded. Sometimes, however, this results from a simultaneous raising of the entire upper eyelid and also its tarsal part.

The infraorbital triangle and the infraorbital furrow. At extreme upwards pulling of the soft parts in the upper facial region, the upper medial corner of the infraorbital triangle can also be pulled somewhat upwards, whereby the infraorbital furrow is deepened.

The nasal region. For the same reason, the skin over the nasal bridge can be stretched down to the tip of the nose, which thereby is raised a trifle.

1 The medial part of the frontal muscle (pars medialis m. frontalis)

Fig. 34

The eyebrow and the forehead. Raises the medial part of the eyebrow. The eyebrow will thus stand obliquely, and this oblique position is even more marked if, at the same time, the intermediate and lateral parts of the eyebrow are depressed because of an activity of the eyebrow wrinkler (see below, 4). Consequently, the two eyebrows together form an angle, open at the bottom, similar to the two long shanks of the capital A. An eyebrow with this type of oblique position is therefore here called A-eyebrow. The medial parts of the frontal skin are furrowed transversely.

Glabella region and the root of the nose. The glabella region is smoothed, and the root of the nose becomes narrower.

The eyelids and the palpebral fissure. Raises the medial parts of the cover fold.

2 The lateral part of the frontal muscle (pars lateralis m. frontalis)

Fig. 34

The eyebrow and the forehead. Raises the lateral part of the eyebrow. The eyebrow will thus stand obliquely, and this oblique position is even more marked if, at the same time, the medial part of the eyebrow is depressed because of an activity of the glabella depressor and the eyebrow depressor (see below, 3 and 5). Consequently, the two eyebrows together will form an angle, open at the top, similar to the two shanks of the capital V. An eyebrow with this type of oblique position is therefore here called V-eyebrow. The lateral parts of the frontal skin are furrowed transversely.

The eyelids and the palpebral fissure. Raises the lateral parts of the cover fold.

3 The glabella depressor (m. procerus or m. depressor glabellae)

Fig. 35

Originates in the upper part of the nasal bridge and radiates in the shape of a fan upwards into the glabella region.

The eyebrow and the forehead. Can co-operate at the depressing of the medial parts of the eyebrow. Can also bring the eyebrows closer to each other.

The glabella region and the root of the nose. Depresses the skin over the glabella region. The root of the nose becomes broader at the same time as one or more transverse furrows are produced over the root of the nose. In the literature, such a transverse furrow has sometimes been called "champion pucker". If the eyebrows have been brought closer to each other, an indication of vertical furrows can sometimes be noted.

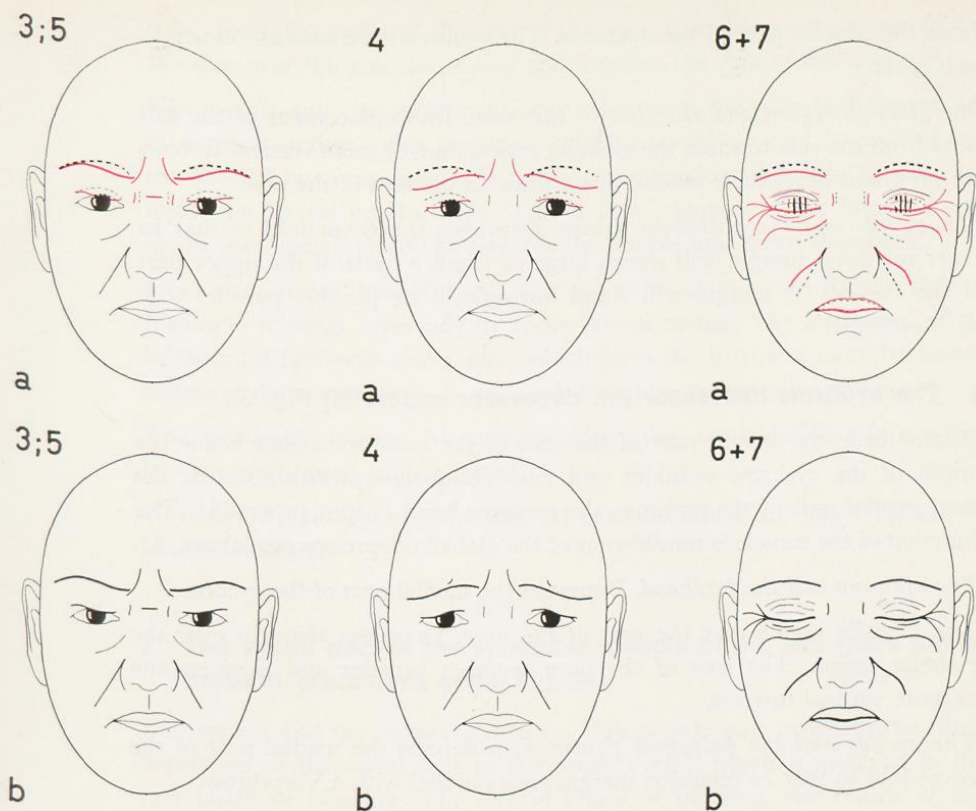


Fig. 35. Schematic presentation of the effect produced by the glabella depressor (m. procerus or m. depressor glabellae, 3); the eyebrow depressor (m. depressor supercilii, 5); the eyebrow wrinkler (m. corrugator supercilii, 4); the sphincter muscle of the eye (m. orbicularis oculi, 6+7); the orbital part, 6; the eyelid part, 7.

The eyelids and the palpebral fissure. If the muscle is able to depress the medial parts of the eyebrow, the soft parts lying underneath are also pressed downwards. The medial part of the cover fold is also depressed. Its revulsion margin, in that event, will run parallel with a V-eyebrow.

4 The eyebrow wrinkler (m. corrugator supercilii) Fig. 35

Originates in the lateral part of the root of the nose and radiates obliquely upwards to the skin of the forehead above the middle part of the eyebrow.

The eyebrow and the forehead. Depresses the middle and possibly also the lateral part of the eyebrow, which has an upward directed concavity. In connexion with this, there is a slight depression, the eyebrow depression,

above the middle part of the eyebrow. The eyebrows are brought closer to each other.

The glabella region and the root of the nose. By displacement of the soft parts from the side towards the glabella region, one or more vertical furrows are produced here; these extend down towards the root of the nose.

The eyelids and the palpebral fissure. Depresses the cover fold so that its lower revulsion margin will screen large or smaller parts of the upper part of the fissure. Its margin will stand horizontally or possibly parallel with an A-eyebrow.

5 The eyebrow depressor (*m. depressor supercilii*) Fig. 35

Originates in the lateral part of the root of the nose, somewhat below the origin of the eyebrow wrinkler and rises obliquely upwards towards the most medial part of the eyebrow, the eyebrow head (*caput supercilii*). The function of the muscle is reminiscent of the glabella depressor (see above, 3).

The eyebrow and the forehead. Depresses the medial part of the eyebrow.

The glabella region and the root of the nose. Depresses the skin over the glabella region. The root of the nose becomes broader and is given one or more vertical furrows.

The eyelids and the palpebral fissure. Can depress the medial part of the cover fold so that its revulsion margin runs parallel with a V-eyebrow.

6+7 The sphincter muscle of the eye (*m. orbicularis oculi*) Fig. 35

A short, firm, connective tissue ligament, the palpebral ligament, extends from the bony part of the root of the nose towards the inner corner of the eye. This ligament is the origin of a very large number of muscle fibres which surround the eye-socket in concentric circles. These fibres together form a round lamina or plate, which represents a muscular framework in the eyelids and their immediate surroundings. The muscle fibres belonging to the eyelids themselves are called the eyelid part (see below, 7) whereas the muscle fibres lying peripherally of it are the orbital part (see below, 6). The muscle has also a third part situated medially but deeper in, the lacrimal part; this, however, is of no interest in this discussion. The muscle mainly acts constricting on the palpebral fissure similar to a sphincter muscle. In connexion with this, the soft parts in the immediate surroundings are pulled towards this fissure in a manner seen in more detail below.

6 The orbital part of the sphincter muscle of the eye (*pars orbitalis m. orbicularis oculi*) Fig. 35

The eyebrow and the forehead. Can at strong effect depress the eyebrow, especially its lateral part.

The glabella region and the root of the nose. Can at extreme effect depress the skin over the glabella region and broaden the root of the nose.

The eyelids and the palpebral fissure. Contracts the palpebral fissure, and at extreme activity, this becomes tightly screwed up and is covered and surrounded by compressed soft parts. In connexion with this, furrows and folds, the lateral eye furrows, "crow's foot", appear at the lateral corner of the eye, radiating fanlike towards the temple and down the cheek.

The infraorbital triangle and the infraorbital furrow. Raises the infraorbital triangle, especially its upper lateral corner. The lower part of the infraorbital furrow is also raised, which gives the furrow a more horizontal course at the same time as its upwards directed concavity is emphasized.

The nasolabial furrow. At extreme effect, the nasolabial furrow can also be somewhat raised and deepened.

The mouth opening and the lips. At extreme effect the upper lip can be somewhat raised.

7 The eyelid part of the sphincter muscle of the eye (pars palpebralis m. orbicularis oculi) Fig. 35

The eyelids and the palpebral fissure. This muscle part produces the rapid depressing of the tarsal part of the upper eyelid, which is involved in the first phase of blinking. The second phase of blinking, the return of the tarsal part to its initial position, is produced by a special muscle, the levator of the upper eyelid (m. levator palpebrae superioris; cf. the vertical sections through the eye in Fig. 17 above). This muscle, however, does not belong to the mimic muscles. At an increased activity in the eyelid levator, the palpebral fissure can also be dilated beyond the normal (cf. above). If the eyelid part is contracted more slowly, the fissure is closed by a depressing of the upper and a raising of the lower eyelid margin. This occurs, for instance, when we screw up our eyes to protect them from the sun.

8 The nasal muscle (m. nasalis) Fig. 36

The muscle originates in the anterior lower part of the upper jaw, more precisely in the region above the lateral incisor and the canine. From there, the muscle fibres rise upwards and merge into three muscle portions. The largest of these runs laterally upwards, close to the nasal wing; higher up, it curves medially and combines across the nasal bridge with the corresponding muscle portion on the other side. It has therefore been called pars transversa. The other two smaller portions attach themselves at the lower part of the nasal wing and the nasal septum, respectively, and have therefore been called pars alaris and pars septalis, respectively. The effect of

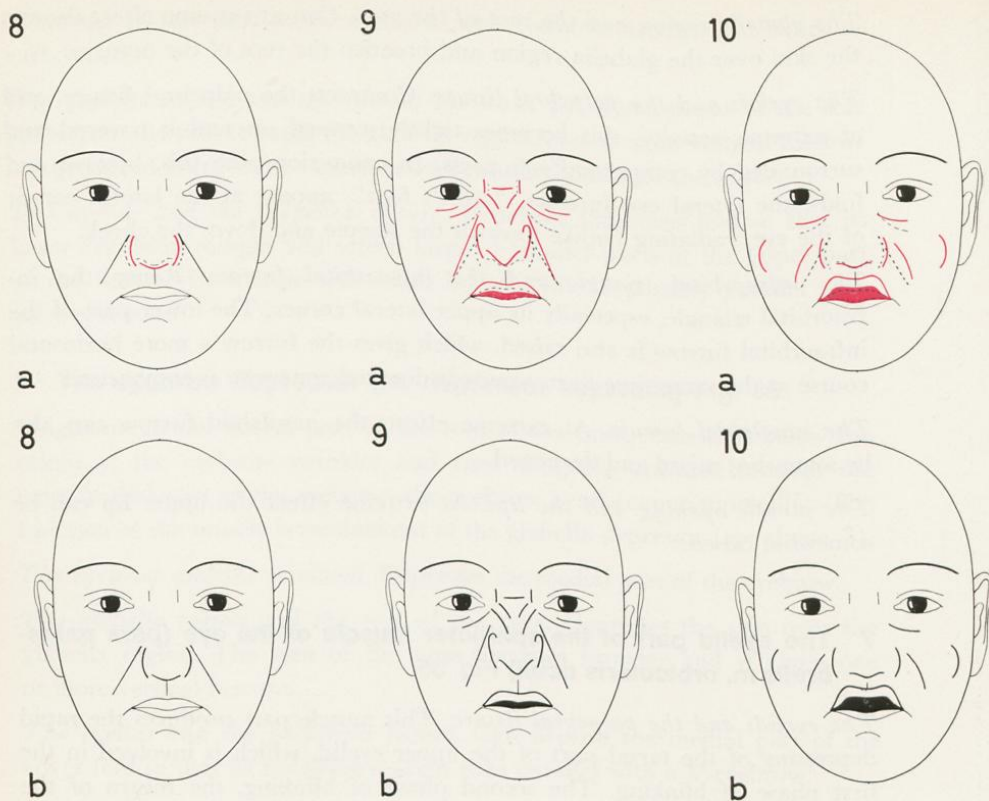


Fig. 36. Schematic presentation of the effect produced by the nasal muscle (m. nasalis, 8); the upper lip and the nasal wing levator (m. levator labii superioris alaeque nasi, 9); the upper lip levator (m. levator labii superioris, 10).

the muscle is restricted to the nasal region, but is of no particular importance in man.

The nasal region. In man, pars transversa lacks the ability to constrict the nasal opening. However, it presses the nasal wing medially. The width of the nostril is reduced at the same time as the posterior nasal wing furrow is deepened. The two smaller portions depress the nasal wing and the lower part of the nasal septum, respectively.

9 The upper lip and the nasal wing levator (m. levator labii superioris alaeque nasi) Fig. 36

In earlier nomenclatures, this muscle has been called caput angulare of m. quadratus labii superioris. The muscle originates in the frontal process of the upper jaw, somewhat below the palpebral ligament mentioned in connexion with the sphincter muscle of the eye. From its origin, the muscle

fibres run downwards in the form of an arc and attach themselves in the lower margin of the nasal wing and in the upper part of the nasolabial furrow.

The glabella region and the root of the nose. The root of the nose broadens somewhat. Transverse furrows are formed. (See otherwise under the nasal region.)

The infraorbital triangle and the infraorbital furrow. The upper medial corner of the infraorbital triangle is pulled upwards. The infraorbital furrow is also raised and deepened.

The nasolabial furrow. Raised and deepened.

The nasal region. The muscle fibres that attach themselves in the nasal wing pull this upwards. But the accuracy of the old concept that the nostril is always dilated by this muscle activity can be disputed. In connexion with the raising of the infraorbital triangle, "nasal bridge swellings" occur at the side of the nasal bridge. Immediately below the root of the nose, folds and furrows are formed on the nasal bridge; these radiate in fanshape upwards. The most lateral of these furrows delimits "the nasal bridge swellings" upwards-medially.

The mouth opening and the lips. When the nasolabial furrow is raised and deepened, the lateral parts of the upper lip can also be raised (unless this is counteracted by the sphincter muscle of the mouth, see below, 23). The middle part of the upper lip also can be raised.

10 The upper lip levator (m. levator labii superioris) Fig. 36

In earlier nomenclature, the muscle has been called caput infraorbitale of m. quadratus labii superioris. It originates somewhat below the middle part of the lower margin of the eye-socket and runs downwards and somewhat medially and attaches itself in the middle part of the nasolabial furrow.

The infraorbital triangle and the infraorbital furrow. Influenced by the nasolabial furrow (see below) the infraorbital triangle is somewhat raised and curved forwards.

The nasolabial furrow. The upper and middle part of the furrow is pulled upwards-laterally at the same time as the furrow is deepened and gets a medially directed concavity.

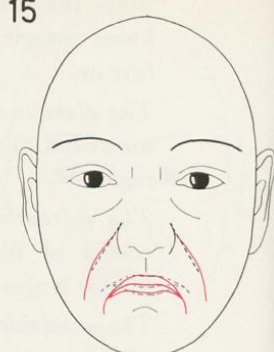
The nasal region. The lower part is somewhat increased in breadth.

The mouth opening and the lips. Influenced by the nasolabial furrow, the lateral parts of the upper lip are also pulled upwards-laterally. Its middle part is raised too. An angular bend of the lower part of the upper lip contour is produced. The mouth is opened a little. The now mentioned change in position and form of the upper lip can be prevented by the sphincter muscle of the mouth (see below, 23).

11;13

12;14

15



a

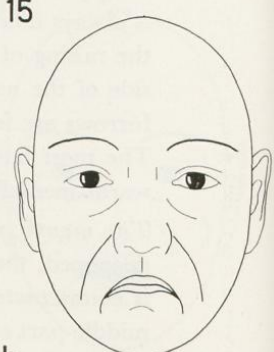
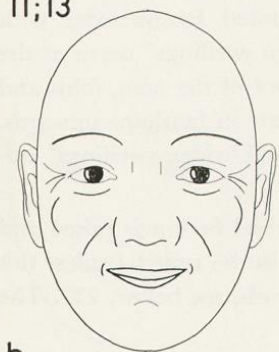
a

a

11;13

12;14

15



b

b

b

Fig. 37. Schematic presentation of the effect produced by the lesser zygomatic muscle (*m. zygomaticus minor*, 11); the levator of the angle of the mouth (*m. caninus*, 13); the greater zygomatic muscle (*m. zygomaticus major*, 12); the smiling muscle (*m. risorius*, 14); the depressor of the angle of the mouth (*m. triangularis*, 15).

11 The lesser zygomatic muscle (*m. zygomaticus minor*) Fig. 37

In earlier nomenclature, this muscle has been called *caput zygomaticum* of *m. quadratus labii superioris*. The muscle begins laterally of the former; it has its origin in the anterior part of the zygomatic bone and thereafter runs obliquely downwards-medially to the lower part of the nasolabial furrow.

The eyelids and the palpebral fissure. Through the upwards pressure of the infraorbital triangle (see below) the muscle contributes to the creation of the lateral eye furrows.

The infraorbital triangle and the infraorbital furrow. Influenced by the nasolabial furrow (see below) the infraorbital triangle is pressed upwards

and curved forwards. The infraorbital furrow is deepened and becomes horizontal.

The nasolabial furrow. The lower part of the furrow is pulled laterally-upwards. The mouth opening increases in breadth and deepens.

The nasal region. The lower part of the nose increases in breadth. Possibly in connexion with this, the nostrils can be expanded.

The mouth opening and the lips. Influenced by the lower part of the nasolabial furrow, the mouth angle can be pulled laterally-upwards (unless this movement effect is counteracted by the sphincter muscle of the mouth, see below, 23). The mouth opening increases in breadth and is given an upwards directed concavity. The median groove on the upper lip (philtrum) becomes shallow or is smoothed out completely.

12 The greater zygomatic muscle (m. zygomaticus major) Fig. 37

The muscle runs from the outside of the zygomatic bone to the lateral angle of the mouth.

The eyelids and palpebral fissure. Being pulled upwards-laterally by the lateral angle of the mouth, the infraorbital triangle becomes pressed upwards (see below) whereby the muscle contributes to creating lateral eye furrows.

The infraorbital triangle and the infraorbital furrow. The infraorbital triangle is pressed upwards and curved forwards. The infraorbital furrow is deepened and has a horizontal course.

The nasolabial furrow. The lower part of the furrow is pulled laterally-upwards and deepened.

The nasal region. The lower part of the nose is increased in breadth. Possibly the nostrils, in connexion with this, can be expanded.

The mouth opening and the lips. The lateral angle of the mouth is pulled laterally-upwards. The mouth opening increases in breadth and is given an upwards directed concavity. The depression at the mouth angle is deepened. The groove on the upper lip (philtrum) becomes shallower or is completely smoothed out.

13 The levator of the angle of the mouth (m. caninus) Fig. 37

In more recent nomenclature, the muscle is called m. levator anguli oris. It originates in a depression on the front of the upper jawbone, somewhat below the origin of the upper lip levator (10), runs medially-downwards, and attaches itself at the angle of the mouth.

The nasolabial furrow. Raises and deepens the lower part of the furrow.

The mouth opening and the lips. Pulls the angle of the mouth upwards and somewhat laterally.

14 The smiling muscle (m. risorius) Fig. 37

Originates in the angle of the mouth, runs in a weakly-arched course laterally, and attaches itself only superficially in the infraorbital triangle, somewhat lateral of the nasolabial furrow. The name is somewhat misleading: the muscle has no greater importance in the mimicry of smiling.

The infraorbital triangle and the infraorbital furrow. Under tension, the muscle produces a small depression, the dimple, where it is attached.

15 The depressor of the angle of the mouth (m. triangularis) Fig. 37

In more recent nomenclature, the muscle is called m. depressor anguli oris. Its origin is broad in the margin of the lower jaw, lateral of the chin boss and rises towards the angle of the mouth.

The nasolabial furrow. The lower part of the furrow is deepened and extended downwards.

The mouth opening and the lips. Pulls the angle of the mouth downwards and gives the mouth opening a curve with a downwards directed concavity. Deepens the depression at the angle of the mouth.

16 The lower lip depressor (m. depressor labii inferioris) Fig. 38

In more recent nomenclature, the muscle is called m. quadratus labii inferioris. It originates in the same way as m. triangularis (15) and is partly covered by this. The muscle fibres thereafter rise upwards-medially to the lower lip. The most medial fibres connect with the corresponding muscle fibres on the other side in the middle of the chin.

The nasolabial furrow. The lower part is extended somewhat downwards and deepened.

The mouth opening and the lips. Pulls the lower lip downwards and somewhat laterally, whereby the lip is tightened. The mouth is opened slightly at the same time.

The chin. Smooths out the soft parts over the chin boss and increases them in breadth. Extends, but at the same time reduces the depth of, the chin-lip furrow.

17 The chin muscle (m. mentalis) Fig. 38

The muscle originates in the front part of the lower jaw, somewhat below the incisors. From there, the muscle runs downwards and attaches itself in the skin of the chin.

The mouth opening and the lips. By raising the soft parts over the chin boss (see below) the muscle also presses the lower lip upwards.

The chin. The soft parts over the chin boss are tightened to a rounded swelling, which is raised upwards. Thereby, the chin-lip furrow is also emphasized.

16

17

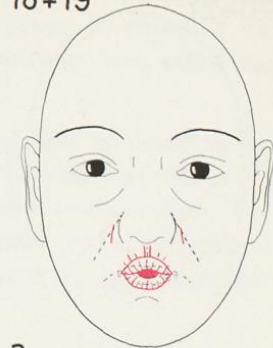
18+19



a



a



a

16

17

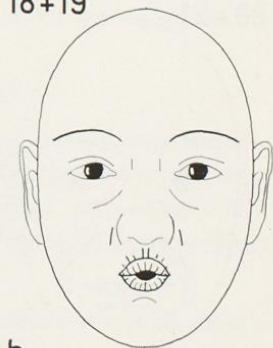
18+19



b



b



b

Fig. 38. Schematic presentation of the effect produced by the lower lip depressor (m. depressor labii inferioris, 16); the chin muscle (m. mentalis, 17); the incisive muscles of the upper and lower lips (mm. incisivi labii superioris et inferioris, 18+19).

18+19 The incisive muscles of the upper lip and the lower lip (mm. incisivi labii superioris, 18, et inferioris, 19) Fig. 38

Originate in the front of the upper jaw and the lower jaw, respectively, from a small region above and below the lateral incisor and attach themselves at the angle of the mouth.

The nasolabial furrow. Because of the effect on the mouth opening (see below) the lower part of the nasolabial furrow is weakened or completely smoothed out.

The mouth opening and the lips. Pulls, at co-operation, the angle of the mouth medially. The mouth opening becomes small and rounded, as when pronouncing the vowel in the word fool. The median groove on the upper lip (philtrum) is emphasized.

20+21



a

22



a

23



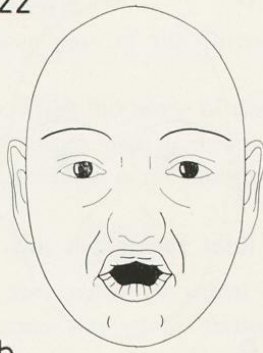
a

20+21



b

22



b

23



b

Fig. 39. Schematic presentation of the effect produced by the cheek muscle (*m. buccinator*, 20+21);

the lower lip part, 20;

the upper lip part, 21;

the sphincter muscle of the mouth (*m. orbicularis oris*, 22+23);

the lip part, 22;

the marginal part, 23.

20+21 The cheek muscle (*m. buccinator*) Fig. 39

The muscle has a broad origin lying far back in the deepest parts of the cheek, more precisely in the vicinity of the teeth lying farthest back in the upper and lower jaws, and in a special connective tissue ligament (*ligamentum pterygomandibulare*). From here, the muscle fibres run as a broad band towards the mouth opening, where they merge into the latter's circular musculature (see below). The upper muscle fibres (20) merge into the lower lip; the lower muscle fibres (21) merge into the upper lip. The muscle represents a muscular framework in the chin and thereby also in the lateral wall of the cavity of the mouth. It plays an important role in retaining food between the rows of teeth during chewing. It is

highly important at, e. g., glass blowing and trumpet blowing. When it is expanded, it is the mouth cavity's most active power in expelling air against a resistance. The muscle has therefore sometimes been called the "trumpet muscle".

The infraorbital triangle and the infraorbital furrow. The influence on the angle of the mouth affects the nasolabial furrow (see below) as well as the infraorbital triangle, which is pressed backwards and curved outwards. The inner parts of the cheek are tensed. The upper parts of the infraorbital triangle and the infraorbital furrow do not appear to be appreciably affected.

The nasolabial furrow. By the influence on the angle of the mouth (see below), the nasolabial furrow, especially its lower parts, is pulled laterally-backwards and gets a medially open angular bend at the same time as it is deepened.

The nasal region. Its lower part is increased in breadth.

The mouth opening and the lips. The angle of the mouth is drawn laterally and slightly upwards. The mouth opening is thereby extended at the same time as the lips tighten and become thinner. The mouth angle depression is deepened, whereas the median groove on the upper lip (philtrum) becomes shallower or is completely smoothed out.

The chin. The skin over the chin is stretched and sometimes small depressions appear laterally of the chin boss. The chin-lip furrow is broadened, but at the same time becomes less marked.

22+23 The sphincter muscle of the mouth (m. orbicularis oris)

Fig. 39

With its muscle fibres arranged in concentric circles around the mouth opening, the muscle closely resembles the sphincter muscle of the eye (6+7). The part of the muscle that belongs to the red parts of the lips is called the marginal part (*pars marginalis*, see below, 23) whereas the part situated peripherally of it in the skin parts of the lips is called the lip part (*pars labialis*, see below, 22). The muscle fibres of the lip part together form a muscular plate, which extends in the main in a plane standing vertically, parallel with the frontal plane of the face. The muscle fibres of the marginal part in the upper lip and in the lower lip form a band that stretches from one angle of the mouth to the other in the horizontal plane. Moreover, small, fine, muscle fibres (*musculi recti*) are present in the lips and run from the skin part of the lip obliquely downwards-backwards (in the upper lip), as well as upwards-backwards (in the lower lip), to the mucous membrane. They are responsible for finer changes in the shape of the lips; however, they will not be discussed more fully here.

In the main, the muscle contracts the mouth opening in a sphincterlike manner; it is also able in other ways to change its form and appearance. It is of fundamental importance that the muscle, through its tension, is able to counteract the change in shape of the mouth opening, which dilators acting from outside could create. When, for instance, it is pointed out in the foregoing that *m. zygomaticus minor* by pulling the lower part of the nasolabial furrow laterally-upwards also pulls the angle of the mouth in this direction, the latter effect fails to appear if *m. orbicularis oris* is brought into function (cf. also above, Fig. 30 d). If the lips are to be put under tension, the angle of the mouth must be kept in place by the dilators attached there being brought into action. This explains the side effects on the nasolabial furrow and the chin that can be produced by *pars marginalis* (see below).

22 The lip part of the sphincter muscle of the mouth (*pars labialis m. orbicularis oris*) Fig. 39

The nasolabial furrow. Its lower part is extended and carried medially.

The mouth opening and the lips. Constricts the mouth opening. Tightens the skin parts of the lips. If the red parts of the lips are not tensed, they shoot out in a funnel-shaped way as when pronouncing the word *flirt*. If the red parts are somewhat tensed, the mouth takes on the appearance as when pronouncing the word *fool*.

23 The marginal part of the sphincter muscle of the mouth (*pars marginalis m. orbicularis oris*) Fig. 39

The nasolabial furrow. A slight depression appears at its lower part, caused by the increased tension in the tissue.

The nasal region. If the upper lip is rolled inwards under the upper incisor margin (see below), the lower soft parts of the nose are pulled downwards.

The mouth opening and the lips. Constricts the mouth opening. Tightens the red parts of the lips as when pronouncing the consonant *P*. Can at somewhat extended mouth opening "roll in" the tensed lips between the rows of teeth. Depresses the upper lip and raises the lower lip, and increases the height of the upper lip. Small furrows appear on the upper lip.

The chin. Smoothed out through simultaneous tension, probably in *m. triangularis* and in the lower lip depressor (cf. above).

* *
*

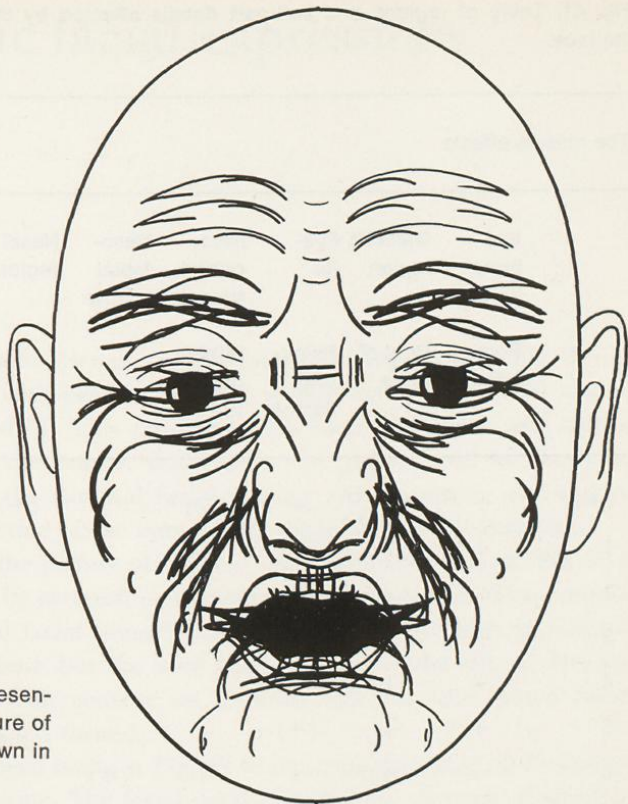


Fig. 40. Schematic presentation in a single picture of all muscle effects shown in Fig. 34–39.

In a highly varied manner, the different mimic muscles can thus influence the facial picture and its various details. This is beautifully illustrated if the muscle effects now described and shown in the figures 34–39 are combined into one single picture. This has taken place in Fig. 40, which was obtained by superimposing all the figures. However, it must be pointed out that the muscle effects marked on all the drawings are only intended to show what each muscle can, in the main, produce. Thus they must not be interpreted either as “maximum effects” or “minimum effects”. Naturally, they only illustrate a purely static condition and not a dynamic one.

Fig. 41 presents a table from which can be seen the regions and facial details affected by the various mimic muscles.

Fig. 41. Table of regions and soft-part details affected by the mimic muscles of the face.

The muscle affects

	Eye- brow	Glabella region	Eye- lid	Infra- orbital triangle	Naso- labial furrow	Nasal region	Mouth opening	Chin
	Fore- head	Root of nose	Palpe- bral fissure	Infra- orbital furrow			Lips	
1+2	+	+	+	(+)		(+)		
1	+	+	+					
2	+		+					
3	+	+	(+)					
4	+	+	+					
5	+	+	(+)					
6	+	(+)	+	+	(+)		(+)	
7			+					
8						+		
9		(+)		+	+	+	(+)	
10				+	+	+	+	
11			+	+	+	+	+	
12			+	+	+	+	+	
13					+		+	
14				+				
15					+		+	
16					+		+	+
17							+	+
18+19					+		+	
20+21				+	+	+	+	+
22					+		+	
23					(+)	(+)	+	+

VI Mimic facial expressions

Our first impulse is to attempt to combine various b-pictures in Fig. 34—49 (“mimic letters”) with one another into certain determined facial expressions (“mimic words”). This experiment has been carried out and will be presented here to the reader. But first a few pictures will be shown to demonstrate what the external facial contour can suggest to our idea of head position, direction of the eyes, and perhaps also facial expression.

Fig. 42 a shows the picture of “Victor”, now well known to us. Fig. 42 b merely reproduces its external facial contour with both ears. This contour we call the “frontal facial frame”. Fig. 42 c merely reproduces an isolated external facial contour, but the head here is turned to the left, so that the left ear is hidden. This contour we therefore call the “the turned facial frame” (in this case, left-turned).

An attempt has been made in Fig. 43 to illustrate the effect of displacing the frontal facial frame. The facial details in all three pictures, of which a is “Victor”, are exactly the same. In b, however, the facial frame has been displaced somewhat upwards; the observer therefore gets the impression that the head is bent forwards. In c, the frame has been displaced downwards; the head therefore now seems to be bent backwards. In Fig. 44, the

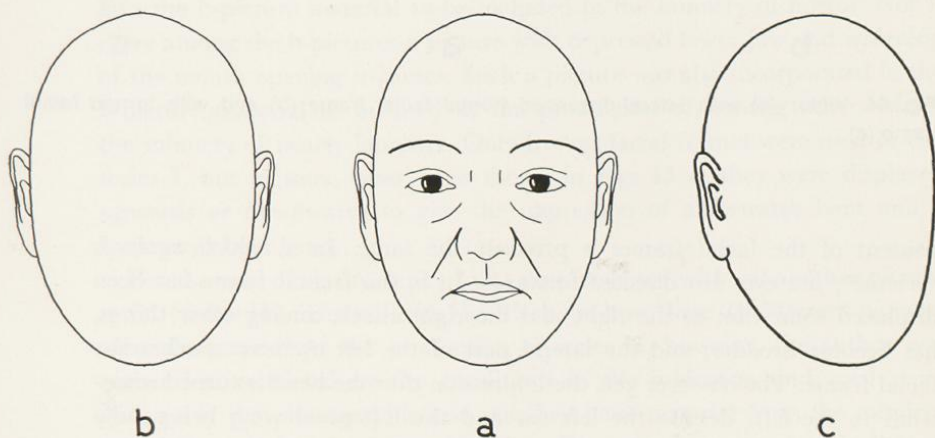


Fig. 42. Victor (a), frontal facial frame (b), turned facial frame (c). See text.

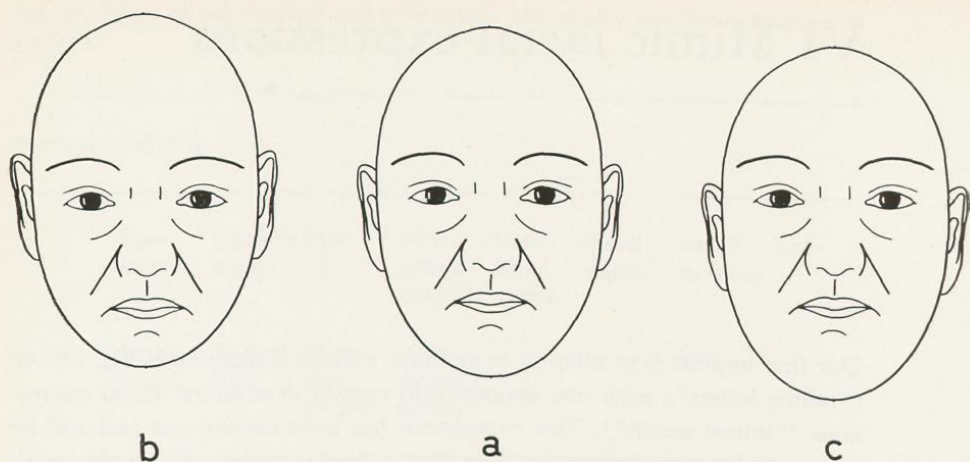


Fig. 43. Victor (a) with upwards-displaced frontal facial frame (b) and with downwards-displaced frontal facial frame (c).

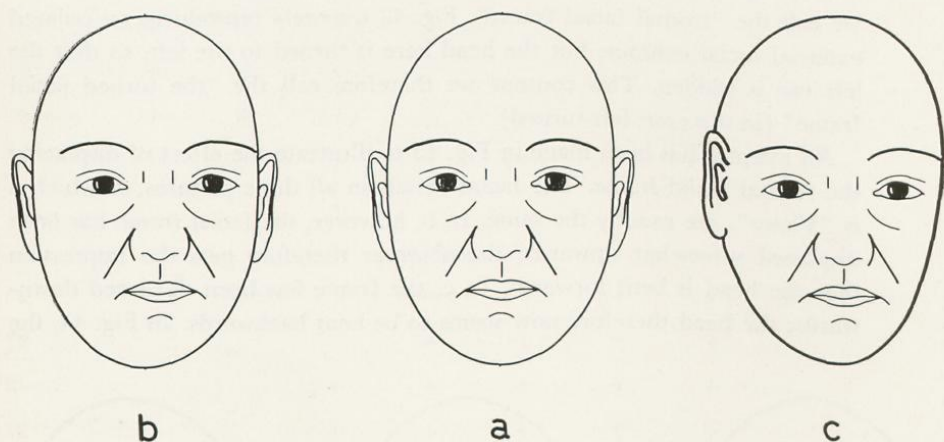


Fig. 44. Victor (a) with lateral-displaced frontal facial frame (b) and with turned facial frame (c).

content of the facial frames is precisely the same. In a, which again is "Victor", the eyes are directed forwards. In b, the frontal frame has been displaced somewhat to the right and the right cheek, among other things, has become broader, and the lateral part of the left eyebrow touches the facial frame. The observer gets the impression that the head is turned somewhat to the left, despite the left ear and the left nasal wing being fully visible. Because the iris is central, the observer also gets the impression that the direction of the eye has followed this turning; the face therefore seems

to be looking to the left (cf. above, Fig. 28, where the direction of the eye, however, is to the right). This impression is still more emphasized if the left-turned facial frame is used, as occurs in picture c.

To be able to carry out the experiment with the aid of different b-pictures in Fig. 34–39 to create different mimic facial expressions, it was primarily necessary to have access to a collection of representative mimic facial expressions to serve as models. Therefore a list of 24 different emotional conditions was made, which experience teaches us are usually characterized by certain facial mimicry. They are listed in the table in Fig. 45 in 8 groups designated A, B, . . . H. An experimental subject was allowed to study in detail and think over the list. He then was asked to produce the mimic facial expressions corresponding to the emotional conditions. These were photographed and drawn. The material, "the basic material", thus obtained was then compared with the b-pictures in Fig. 34–39. Those b-pictures were chosen that together could be thought to produce a certain given mimicry. Finally, a drawn picture series (series I) containing 24 different pictures was made. The table in Fig. 45 shows how these are designated.

In the main, only b-pictures were used to produce this series I. In some cases, the effects produced by each muscle, however, were strengthened, in others, weakened, a matter that can be fully defended because, as earlier mentioned, the b-pictures only reproduce the main muscle effects and do not represent either "maximum effects" or "minimum effects". Where several muscles with different effects on an organ structure were active, for instance at the mouth opening, the objective was to arrive at some form of average effect, i.e. to give the organ structure such a shape that it reflected something of the influence of each engaged muscle. No picture with dilated palpebral fissure, caused by raising the upper eyelid margin, is found among the b-pictures. Such a picture was therefore introduced into the b-picture material to be included in the mimicry of horror. Nor is there among the b-pictures a picture with depressed lower jaw and widening of the mouth opening it causes. Such a picture was also incorporated in the b-picture material to be used at the production of, among other things, the mimicry of hearty laughter. Only frontal facial frames were used in this series I, but in some cases — as shown in Fig. 43 — they were displaced upwards or downwards to give the impression of a forwards bent and a backwards bent head.

For the sake of clarity, series I was supplemented with yet another picture series (series II). The table in Fig. 45 shows how these 24 different pictures were designated. At the production of series II, however, the author was rather less restricted by the conditions in the b-pictures and used more generously the photographic and sketched basis material from the mimicry production of the experimental subject. Thus, for instance, the iris did not always adopt a central position, which is throughout the case in series I.

Fig. 45. Table showing the group classification of 24 different emotional conditions, designation of the picture series, and figure references.

Group	Running		Picture		Figure number
	number	Emotional condition	Series I	Series II	
A	1	Precise, resolute, firm, severe	A:1	a:1	46
	2	Stern, angry	A:2	a:2	
	3	Furious, incensed	A:3	a:3	
B	4	Mild, smiling, friendly	B:1	b:1	47
	5	Happy	B:2	b:2	
	6	Hearty laughter	B:3	b:3	
C	7	Ingratiating smile	C:1	c:1	48
	8	Cunning, crafty, slyly smiling	C:2	c:2	
	9	Self-satisfied smile	C:3	c:3	
D	10	Sad, worried, grieved	D:1	d:1	49
	11	Mournful, almost in tears	D:2	d:2	
	12	Physically hurt, tormented	D:3	d:3	
E	13	Suspicious, "is that really so?"	E:1	e:1	50
	14	Observing, enquiring, examining	E:2	e:2	
	15	Perplexed, "what shall I do?"	E:3	e:3	
F	16	Surprised	F:1	f:1	51
	17	Frightened	F:2	f:2	
	18	Panic-stricken, anguished	F:3	f:3	
G	19	Superior, scornful, ironic	G:1	g:1	52
	20	Contemptuous, condescending, supercilious	G:2	g:2	
	21	Arrogant, self-satisfied, self-sufficient	G:3	g:3	
H	22	Disgusted, "it smells bad"	H:1	h:1	53
	23	Nauseated, "it tastes bad"	H:2	h:2	
	24	Bitter, woeful, disappointed	H:3	h:3	

The frontal facial frames that were used were — as in series I — when necessary displaced upwards and downwards, and in some instances also bent to the side. Side-turned facial frames were also used in some cases.

The observation can naturally be made that the photographic basic material is neither complete nor free from objections: it only represents one single experimental subject's concept of and ability to produce the mimic facial expressions corresponding to the emotional conditions in the list. Another person given the same task would perhaps have produced mimic facial expressions of another type. This objection is justified. It is well known that the mimicry of shedding tears can appear in many different guises and not only in the way produced in the present picture series. What the question primarily refers to is whether these pictures series in their highly schematic formulation actually give a fairly representative expression of the mimicry they are intended to illustrate. When studying the picture series, the reader should be able to form his own opinion about this. However, the author has let a large number of colleagues and students study the series and then make the "mimic" diagnosis. The result of these experiments were so satisfactory that the author considers it fully justified to use the picture series for his analyses.

At a more detailed inspection of the table in Fig. 45, it is found that in most cases — but not all — there is a more or less decisive relation between the three emotional conditions combined into one group. This, then, should also apply to the three pictures in the group. That this is actually so, we will be able to establish in the following.

When we are now about to analyse and record typical features in various mimic facial expressions, the group classification of the emotional conditions given in Fig. 45 will be followed. Both picture series are treated at the same time. Thus when under group A, picture 1 is mentioned, both picture A:1 and picture a:1 are referred to. Usually, the statements refer to the pictures of both picture series and only exceptionally to the one or the other picture series. The descriptions are consistently introduced by a table of the more important muscles that have most probably co-operated in the origin of each mimic facial expression. A compilation of these is added as Appendix 1. Muscles that have only indirectly, or only possibly, taken part are set within parentheses. The figure noted at each muscle agrees with the number used in the foregoing for the mimic musculature and can therefore also be used to identify those b-pictures in Fig. 34—39 that have formed the basis for the production of the picture series. Only more characteristic features, of course, can be treated here, and for the sake of clarity, they are recorded under the anatomical facial structures and regions they belong to.

Group A

Picture 1 (Fig. 46).

Mimic facial expression: Precise, resolute, firm, severe.

Co-operating muscles:

- (2. The lateral part of the frontal muscle)
3. The glabella depressor
5. The eyebrow depressor
- (16. The lower lip depressor)
- (17. The chin muscle)
- (20 + 21. The cheek muscle)
23. The marginal part of the sphincter muscle of the mouth

The eyebrows and the forehead: The medial parts of the eyebrows are slightly depressed, whereas the lateral parts are possibly slightly raised. A tendency to V-eyebrows is therefore present. The lateral parts of the frontal skin is perhaps furrowed transversely.

The glabella region and the root of the nose: Here the soft parts are slightly depressed with somewhat marked vertical frontal furrows. The root of the nose is broadened and shows the suggestion of a transverse furrow.

The eyelids and the palpebral fissure: The cover fold of the upper eyelid is slightly pressed downwards. The revulsion margin of the cover fold is depressed and screens the upper part of the palpebral fissure, which in itself is otherwise unaffected. There is possibly a tendency to V-position by the cover fold margin.

The nasolabial furrow: The furrow is insignificantly extended downwards by the tension in the muscles surrounding the mouth opening.

The mouth opening and the lips: The mouth is pinched and the lips are tightened.

The chin: The soft parts over the chin boss are somewhat tightened.

The head: Possibly the head is bent slightly forwards.

The teeth: Clenched.

Picture 2 (Fig. 46).

Mimic facial expression: Stern, angry.

Co-operating muscles:

2. The lateral part of the frontal muscle
3. The glabella depressor
5. The eyebrow depressor
15. The depressor of the angle of the mouth

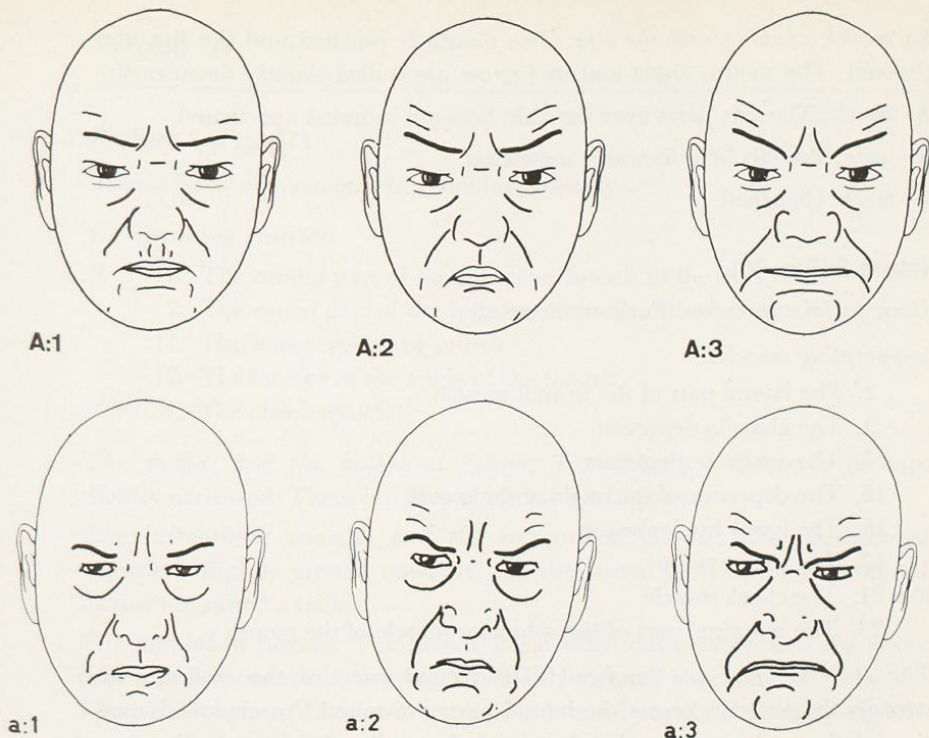


Fig. 46. Schematic presentation of mimic facial expressions, Group A.

Picture 1. Precise, resolute, firm, severe;

Picture 2. Stern, angry;

Picture 3. Furious, incensed.

16. The lower lip depressor

17. The chin muscle

(20+21. The cheek muscle)

23. The marginal part of the sphincter muscle of the mouth

The eyebrows and the forehead: The medial parts of the eyebrows are depressed, whereas the lateral parts are raised. A clear tendency to V-eyebrows is thus present. The forehead shows obvious transverse furrows laterally.

The glabella region and the root of the nose: The soft parts over the glabella region are depressed and clearly marked vertical frontal furrows are present. The nasal root is broadened and shows an obvious transverse furrow.

The eyelids and the palpebral fissure: The cover fold of the upper eyelid is pressed slightly downwards. The cover fold margin is depressed and screens the upper part of the palpebral fissure, which in itself is otherwise unaffected. There is possibly a tendency to V-position by the cover fold margin.

The nasolabial furrow: The furrow is clearly extended downwards by the tension in the muscles surrounding the mouth opening.

The mouth opening and the lips: The mouth is pinched and the lips are tightened. The mouth angle and its furrow are pulled slightly downwards.

The cheek: The soft parts over the chin boss are rounded and tensed.

The head: Possibly bent forwards somewhat.

The teeth: Clenched.

Picture 3 (Fig. 46).

Mimic facial expression: Furious, incensed.

Co-operating muscles:

2. The lateral part of the frontal muscle
3. The glabella depressor
5. The eyebrow depressor
15. The depressor of the angle of the mouth
16. The lower lip depressor
17. The chin muscle
- 20 + 21. The cheek muscle
23. The marginal part of the sphincter muscle of the mouth

The eyebrows and the forehead: The medial parts of the eyebrows are strongly depressed, whereas the lateral parts are raised. An obvious V-position of the eyebrows can thus be noted. Laterally, the frontal skin shows strongly marked transverse furrows.

The glabella region and the nasal root: The soft parts over the glabella region are depressed, and heavily marked, vertical frontal furrows are present. The nasal root is broadened and shows heavily marked transverse furrows.

The eyelids and the palpebral fissure: The cover fold of the upper eyelid is strongly pressed downwards. The cover fold margin screens the upper part of the palpebral fissure, which can otherwise be somewhat dilated. The cover fold margin shows a clear tendency for V-position.

The infraorbital triangle and the infraorbital furrow: The lateral part of the infraorbital furrow is pulled downwards.

The nasolabial furrow: The furrow is extended downwards, and its lower part is also pulled outwards, showing a medially open curve of the angle.

The nasal region: Its lower part is clearly broadened.

The mouth opening and the lips: The mouth opening is severely pinched and laterally pulled into a straight line. The mouth angle furrow is deepened and extended downwards-outwards. The lips are tightened.

The chin: The soft parts over the chin boss are rounded and tensed.

The head: Possibly bent forwards somewhat.

The teeth: Clenched.

Group B

Picture 1 (Fig. 47).

Mimic facial expression: Mild, smiling, friendly.

Co-operating muscles:

- (6. The orbital part of the sphincter muscle of the eye)
- 7. The eyelid part of the sphincter muscle of the eye
- 11. The lesser zygomatic muscle
- 13. The levator of the angle of the mouth
- (20 + 21. The cheek muscle)

The eyelids and the palpebral fissure: The palpebral fissure is perhaps slightly narrowed. There is a hint of lateral eye furrows.

The infraorbital triangle and the infraorbital furrow: The infraorbital triangle is slightly pressed upwards, and the lateral parts of the infraorbital furrow are raised a trifle.

The nasolabial furrow: The furrow is extended downwards, and the lower part is pulled outwards, showing a medially directed concavity.

The nasal region: The lower part of the nasal region is possibly slightly broadened.

The mouth opening and the lips: The mouth is pulled a trifle in lateral direction. The mouth angle depression is clearly marked.

The head: Possibly bent somewhat forwards and to the side.

The gaze: The gaze can be lowered.

Picture 2 (Fig. 47).

Mimic facial expression: Happy.

Co-operating muscles:

- (1. The medial part of the frontal muscle)
- (2. The lateral part of the frontal muscle)
- 11. The lesser zygomatic muscle
- 12. The greater zygomatic muscle
- 13. The levator of the angle of the mouth
- 14. The smiling muscle
- (20 + 21. The cheek muscle)

The eyebrows and the forehead: Possibly the eyebrows are raised, in which case marked transverse frontal furrows are present.

The glabella region and the root of the nose: If the eyebrows are raised, the soft parts of the glabella region are pulled upwards, and the root of the nose is narrowed.

The eyelids and the palpebral fissure: If what is now said is valid, the cover fold of the upper eyelid is pulled upwards a trifle and the upper eye furrow is suggested. The lateral eye furrows are emphasized.

The infraorbital triangle and the infraorbital furrow: The infraorbital triangle is pressed upwards, and the lateral parts of the infraorbital furrow are raised. The dimples are clearly marked.

The nasolabial furrow: The lower part of the furrow is pulled outwards-upwards and has a medially directed concavity.

The nasal region: Its lower part is slightly broadened.

The mouth opening and the lips: The mouth is slightly opened, strongly broadened, and shows an upwards directed concavity. The mouth angle is pulled upwards-outwards and the mouth angle depression emphasized. The philtrum is more shallow or completely smoothed out.

The teeth: The front teeth of the upper jaw are possibly exposed.

The lower jaw: Possibly this is somewhat depressed.

Picture 3 (Fig. 47).

Mimic facial expression: Hearty laughter.

Co-operating muscles:

1. The medial part of the frontal muscle
2. The lateral part of the frontal muscle
- 6 + 7. The sphincter muscle of the eye
9. The upper lip and the nasal wing levator
11. The lesser zygomatic muscle
12. The greater zygomatic muscle
13. The levator of the angle of the mouth
14. The smiling muscle
- 20 + 21. The cheek muscle

The eyebrows and the forehead: The eyebrows are considerably raised, and the forehead shows marked transverse furrows.

The glabella region and the root of the nose: The soft parts over the glabella region are pulled strongly upwards, and the root of the nose is narrow.

The eyelids and the palpebral fissure: The cover fold of the upper eyelid is pulled upwards, and the upper eye furrow is visible. The palpebral fissure is narrowed, and the lateral eye furrows are strongly marked.

The infraorbital triangle and the infraorbital furrow: The infraorbital triangle is raised and pressed upwards. Its medial corner is pulled upwards-medially. The lateral parts of the infraorbital furrow are raised.

The nasolabial furrow: The furrow is deepened and extended and shows a medially opened curve of the angle.

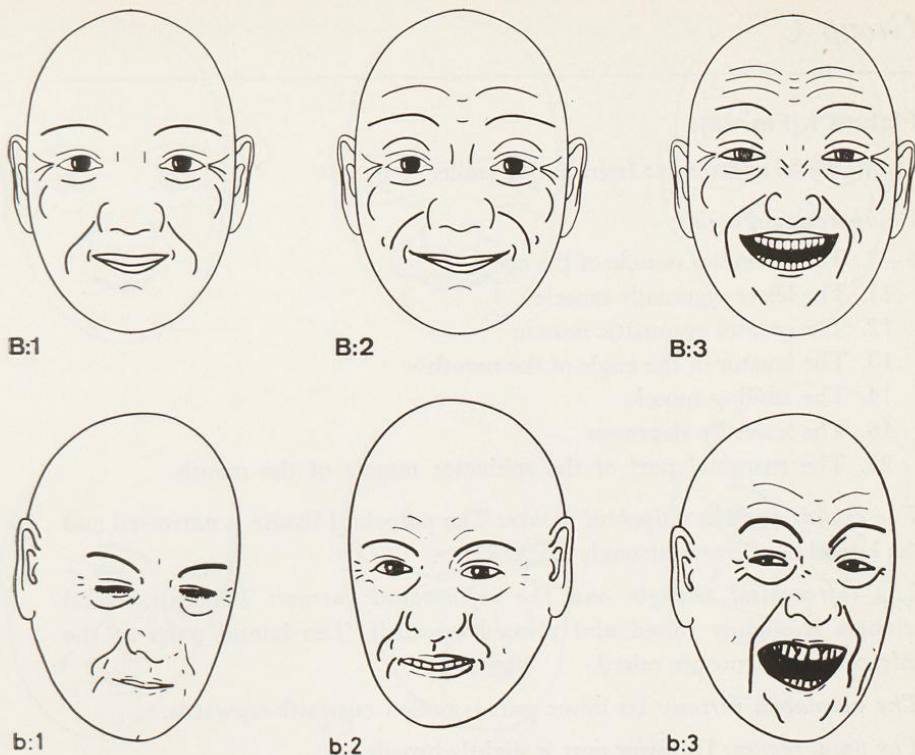


Fig. 47. Schematic presentation of mimic facial expressions, Group B.

Picture 1. Mild, smiling, friendly;

Picture 2. Happy;

Picture 3. Hearty laughter.

The nasal region: In relation to the upwards pulling of the medial corner of the infraorbital triangle, strong nasal bridge swellings and transverse nasal bridge furrows are clearly seen.

The mouth opening and the lips: The mouth opening is wider and broader. Its lower contour shows an upwards directed concavity. The angle of the mouth is pulled strongly upwards-outwards. The lips are narrowed and tightened on account of a direct muscle effect and the lateral displacement of the soft parts of the cheeks and the widening of the mouth opening. The philtrum is smoothed out.

The cheek: The soft parts over the chin boss are smoothed out by the lateral displacement of the soft parts of the cheek.

The head: Possibly bent slightly backwards.

The teeth: Exposed.

The lower jaw: Powerfully depressed.

Group C

Picture 1 (Fig. 48).

Mimic facial expression: Ingratiating smile.

Co-operating muscles:

6 + 7. The sphincter muscle of the eye

11. The lesser zygomatic muscle

12. The greater zygomatic muscle

13. The levator of the angle of the mouth

14. The smiling muscle

16. The lower lip depressor

23. The marginal part of the sphincter muscle of the mouth

The eyelids and the palpebral fissure: The palpebral fissure is narrowed and the lateral eye furrows strongly marked.

The infraorbital triangle and the infraorbital furrow: The infraorbital triangle is slightly raised and pressed upwards. The lateral parts of the infraorbital furrow are raised.

The nasolabial furrow: Its lower part is pulled outwards-upwards.

The nasal region: Its lower part is slightly broadened.

The mouth opening and the lips: The mouth is slightly widened and shows a fairly strongly marked upwards directed concavity. The angle of the mouth is pulled upwards-outwards. The mouth angle depression is emphasized. The lips are a trifle narrowed and tightened.

The chin: The chin-lip furrow is smoothed out.

The head: The mimic is best seen if the head is slightly bent forwards and at the same time to the side.

The teeth: The front teeth in the upper jaw can be exposed.

The gaze: The iris has a medial position.

Picture 2 (Fig. 48).

Mimic facial expression: Cunning, crafty, slyly smiling.

Co-operating muscles:

6 + 7. The sphincter muscle of the eye

11. The lesser zygomatic muscle

12. The greater zygomatic muscle

13. The levator of the angle of the mouth

(20 + 21. The cheek muscle)

(23. The marginal part of the sphincter muscle of the mouth)

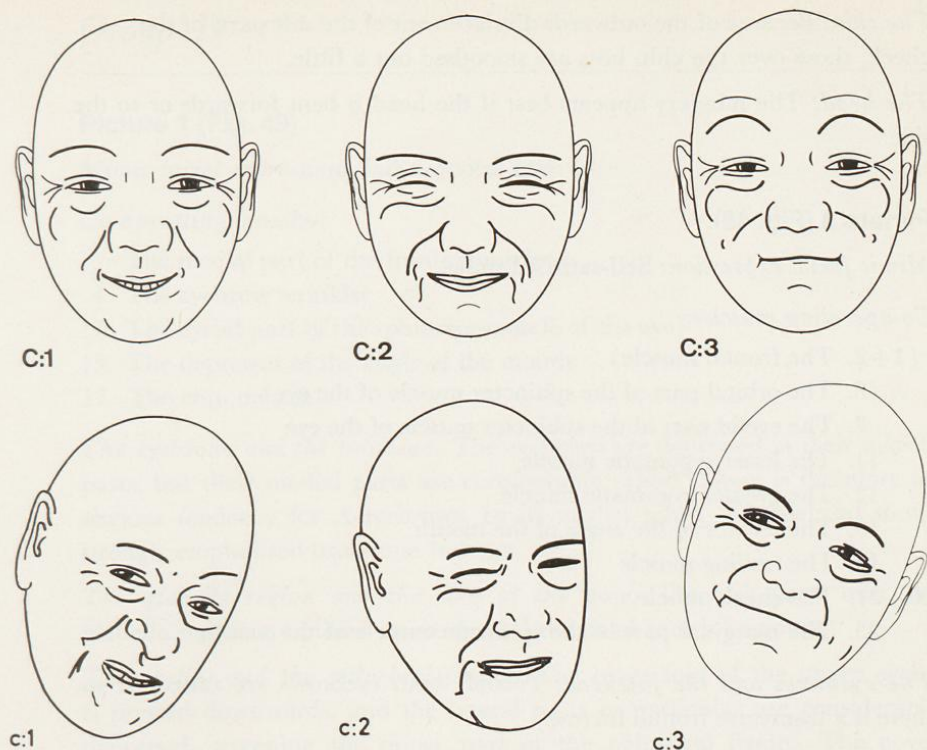


Fig. 48. Schematic presentation of mimic facial expressions, Group C.

Picture 1. Ingratiating smile;

Picture 2. Cunning, crafty, slyly smiling;

Picture 3. Self-satisfied smile.

The eyebrows and the forehead: The eyebrows pulled downwards a trifle.

The eyelids and the palpebral fissure: The palpebral fissure is narrowed rather much and somewhat screwed up, and shows a downwards directed concavity. The lateral eye furrows are emphasized.

The infraorbital triangle and the infraorbital furrow: The infraorbital triangle is pressed slightly upwards, and the lateral parts of the infraorbital furrow are raised.

The nasolabial furrow: The furrow is extended and its lower part pulled outwards, showing a medially directed concavity.

The mouth opening and the lips: The mouth opening is pulled a trifle laterally, as is the angle of the mouth. The mouth angle depression is clearly marked, and the mouth angle furrow is downwards directed. The lips are slightly tightened.

The chin: Because of the outwards displacement of the soft parts of the cheek, those over the chin boss are smoothed out a little.

The head: The mimicry appears best if the head is bent forwards or to the side.

Picture 3 (Fig. 48).

Mimic facial expression: Self-satisfied smile.

Co-operating muscles:

- (1+2. The frontal muscle)
- (6. The orbital part of the sphincter muscle of the eye)
- 7. The eyelid part of the sphincter muscle of the eye
- 11. The lesser zygomatic muscle
- 12. The greater zygomatic muscle
- 13. The levator of the angle of the mouth
- 14. The smiling muscle
- 20+21. The cheek muscle
- 23. The marginal part of the sphincter muscle of the mouth

The eyebrows and the forehead: Possibly both eyebrows are raised. If so, there is a transverse frontal furrow.

The glabella region and the root of the nose: If what is said above is valid, the soft parts over the glabella region are pulled slightly upwards, and the root of the nose is somewhat narrowed.

The eyelids and the palpebral fissure: The palpebral fissure is rather narrowed, and the lateral eye furrows are emphasized.

The infraorbital triangle and the infraorbital furrow: The infraorbital triangle is pressed upwards and the lateral parts of the infraorbital furrow raised. The dimples are rather obvious.

The nasolabial furrow: The lower part of the furrow is pulled considerably outwards-upwards.

The nasal region: Its lower part is rather broadened.

The mouth opening and the lips: The mouth opening is pulled considerably in lateral direction and is therefore strongly widened. The angle of the mouth is also pulled firmly outwards, and the mouth angle depression is emphasized. Because of the tension in the tissues, the lips are much narrowed and tightened.

The chin: The soft parts over the chin boss are smoothed out a little because of the outward displacement of the soft parts of the cheek.

The head: The mimicry appears best if the head is bent to the side.

Picture 1 (Fig. 49).

Mimic facial expression: Sad, worried, grieved.

Co-operating muscles:

1. The medial part of the frontal muscle
4. The eyebrow wrinkler
- (7. The eyelid part of the sphincter muscle of the eye)
15. The depressor of the angle of the mouth
17. The chin muscle

The eyebrows and the forehead: The eyebrows are depressed in their middle parts, but their medial parts are considerably raised. There is therefore an obvious tendency for A-eyebrows. In its medial parts, the forehead shows strongly emphasized transverse furrows.

The glabella region and the root of the nose: The soft parts over the glabella region are pulled upwards, and the nasal root is narrowed.

The eyelids and the palpebral fissure: The cover fold of the upper eyelid is pressed downwards, and the lateral parts in particular are considerably depressed, screening the upper part of the palpebral fissure. The cover fold margin of the eyelid therefore shows a tendency for A-position.

The infraorbital triangle and the infraorbital furrow: Possibly, the medial part of the infraorbital furrow is raised.

The mouth opening and the lips: The mouth angle furrow is pulled rather downwards-outwards; therefore it gives the impression that the mouth opening has a considerably downwards directed concavity. The lips are slack. The lower lip can protrude slightly or be rolled outwards.

The cheek: The soft parts over the chin boss are slightly raised. The chin-lip furrow is fairly marked.

The head: Possibly bent forwards and to the side.

The gaze: This can be downcast.

Picture 2 (Fig. 49).

Mimic facial expression: Mournful, almost in tears.

Co-operating muscles:

1. The medial part of the frontal muscle
4. The eyebrow wrinkler
- (7. The eyelid part of the sphincter muscle of the eye)

- 15. The depressor of the angle of the mouth
- 17. The chin muscle
- 20 + 21. The cheek muscle

The eyebrows and the forehead: The middle parts of the eyebrows are much depressed, whereas the medial parts are raised. Typical A-eyebrows are therefore seen. In its medial parts, the forehead shows well marked transverse furrows.

The glabella region and the root of the nose: The soft parts over the glabella region are pulled upwards. The root of the nose is narrowed.

The eyelids and the palpebral fissure: The cover fold of the upper eyelid is pressed downwards. The lateral parts of the cover fold are rather depressed and screen the upper parts of the palpebral fissure. There is thus a tendency to clear A-position of the cover fold margin. The lateral eye furrows are emphasized.

The infraorbital triangle and the infraorbital furrow: The infraorbital triangle is pressed slightly upwards. The infraorbital furrow is pulled upwards in both its medial and lateral parts. It therefore shows an increased concavity.

The nasolabial furrow: This is extended downwards, and the lower part is pulled outwards, showing a medially directed concavity.

The mouth opening and the lips: The mouth is strongly pulled outwards laterally and is therefore broadened. The angle of the mouth is insignificantly pulled downwards-outwards, and the mouth angle depression is emphasized. The lips are narrowed and somewhat tightened. The lower lip can be slightly rolled outwards.

The chin: The soft parts over the chin boss are considerably raised, and the chin-lip furrow is straightened.

The head: Possibly bent somewhat forwards and to the side.

The gaze: The gaze can be downcast.

Picture 3 (Fig. 49).

Mimic facial expression: Physically hurt, tormented.

Co-operating muscles:

- 3. The glabella depressor
- 5. The eyebrow depressor
- 6 + 7. The sphincter muscle of the eye
- 9. The upper lip and the nasal wing levator
- 18 + 19. The incisive muscles of the upper lip and the lower lip
- 22 + 23. The sphincter muscle of the mouth

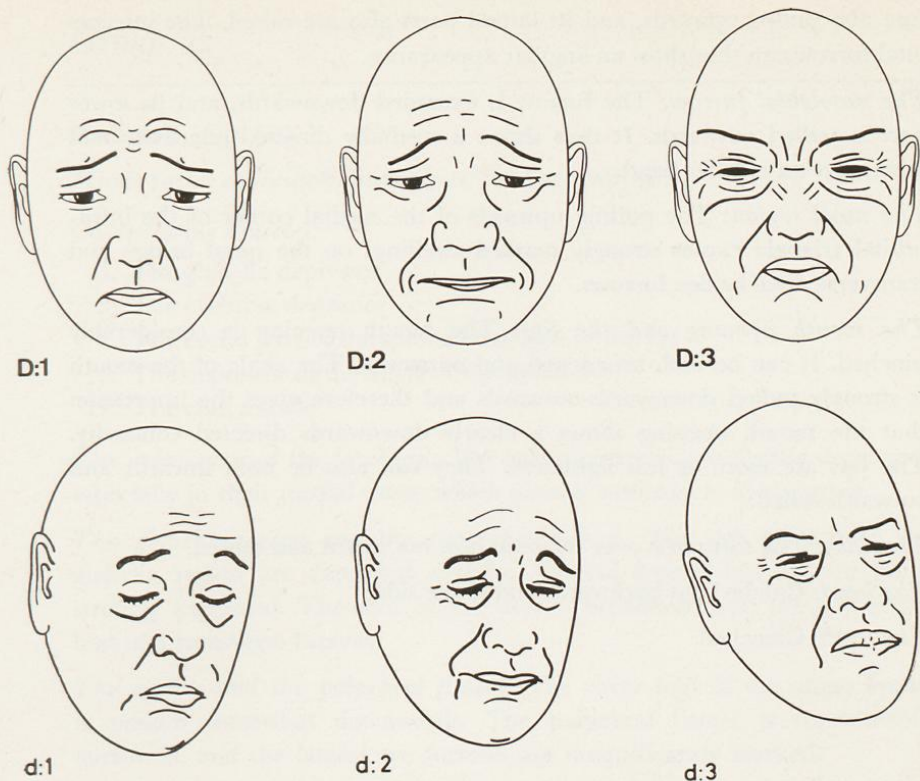


Fig. 49. Schematic presentation of mimic facial expressions, Group D.

Picture 1. Sad, worried, grieved;

Picture 2. Mournful, almost in tears;

Picture 3. Physically hurt, tormented.

The eyebrows and the forehead: The entire eyebrows are slightly depressed, but this concerns particularly the medial and middle parts of the eyebrows. Therefore, a clear tendency to V-eyebrows appears.

The glabella region and the root of the nose: The soft parts over the glabella region are a trifle depressed. Vertical frontal furrows are rather emphasized, and the root of the nose, which is broadened, shows an insignificantly marked transverse furrow.

The eyelids and the palpebral fissure: The palpebral fissure is screwed up. The lateral eye furrows are well marked. The cover fold of the upper eyelid is pressed downwards.

The infraorbital triangle and the infraorbital furrow: The infraorbital triangle is pressed upwards, especially at its medial corner, which is pulled upwards-medially. The medial parts of the infraorbital furrow are there-

fore also pulled upwards, and its lateral parts also are raised. The infra-orbital furrow can thus show an angular appearance.

The nasolabial furrow: The furrow is extended downwards, and its lower part is pulled outwards. It thus shows a medially directed concavity and sometimes an angular bend.

The nasal region: The pulling upwards of the medial corner of the infra-orbital triangle causes strongly marked swellings on the nasal bridge and transverse nasal bridge furrows.

The mouth opening and the lips: The mouth opening is considerably pinched. It can be both broadened and narrowed. The angle of the mouth is strongly pulled downwards-outwards and therefore gives the impression that the mouth opening shows a clearly downwards directed concavity. The lips are more or less tightened. They can also be both inwards and outwards rolled.

The chin: The soft parts over the chin boss are raised and tensed.

The head: Can be bent backwards and to the side.

The teeth: Clenched.

Group E

Picture 1 (Fig. 50).

Mimic facial expression: Suspicious, "is that really so?"

Co-operating muscles:

3. The glabella depressor
5. The eyebrow depressor
7. The eyelid part of the sphincter muscle of the eye
- (15. The depressor of the angle of the mouth)
17. The chin muscle

The eyebrows and the forehead: The entire eyebrows are slightly depressed, especially in their medial parts, which gives a tendency to V-eyebrows.

The glabella region and the root of the nose: The soft parts over the glabella region are depressed a trifle. Vertical frontal furrows are fairly strongly suggested. The root of the nose is broadened and shows a slight hint of a transverse furrow.

The eyelids and the palpebral fissure: The cover fold of the upper eyelid is pressed somewhat downwards. The palpebral fissure is considerably narrowed, and the lateral eye furrows are insignificantly marked.

The nasolabial furrow: This furrow is only slightly extended downwards.

The mouth opening and the lips: Possibly, the angle of the mouth is pulled slightly downwards-outwards. The lower lip is pressed somewhat upwards and has thus pressed the upper lip a little upwards and forwards.

The chin: The soft parts over the chin boss are raised a trifle.

The head: Possibly bent forwards and to the side.

The gaze: Possibly, the iris is set medially.

Picture 2 (Fig. 50).

Mimic facial expression: Observing, enquiring, examining.

Co-operating muscles:

3. The glabella depressor
5. The eyebrow depressor
- (18 + 19. The incisive muscles of the upper lip and the lower lip)
23. The marginal part of the sphincter muscle of the mouth

The eyebrows and the forehead: The entire eyebrows are slightly depressed, especially in their medial parts; they therefore show a tendency to V-position.

The glabella region and the root of the nose: The soft parts over the glabella region are depressed. Vertical frontal furrows are fairly strongly marked. The root of the nose is broadened and shows a rather emphasized transverse furrow.

The eyelids and the palpebral fissure: The cover fold of the upper eyelid is pressed downwards and screens the upper part of the palpebral fissure, which is not otherwise affected.

The mouth opening and the lips: The mouth opening is reduced in breadth (narrowed), and the lips are somewhat tensed and protruding.

The head: The mimicry is best seen if the head is bent forwards a trifle and possibly also to the side.

Picture 3 (Fig. 50).

Mimic facial expression: Perplexed, "what shall I do?"

Co-operating muscles:

1 + 2. The frontal muscle

17. The chin muscle

The eyebrows and the forehead: The entire eyebrows are considerably raised, and the forehead shows emphasized transverse furrows.

The glabella region and the root of the nose: The soft parts over the glabella region are pulled strongly upwards, and the root of the nose is considerably narrowed.

The eyelids and the palpebral fissure: The cover fold of the upper eyelid is strongly pulled upwards, and the upper eye furrow is clearly marked.

The infraorbital triangle and the infraorbital furrow: The infraorbital furrow is raised both in its medial and in its lateral parts. Thus the furrow shows an increased concavity.

The nasolabial furrow: The lower parts of the furrow are pulled somewhat upwards-outwards.

The nasal region: The tip of the nose is raised.

The mouth opening and the lips: The angle of the mouth is pulled slightly upwards-outwards. The lower lip slightly protrudes and is perhaps rolled outwards.

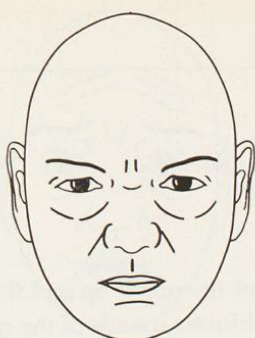
The chin: The soft parts over the chin boss are insignificantly raised.

The head: The mimicry is best seen if the head is bent forwards a little and also to the side.

The gaze: This is perhaps downcast.



E:1



E:2



E:3



e:1



e:2



e:3

Fig. 50. Schematic presentation of mimic facial expressions, Group E.

Picture 1. Suspicious, "is that really so?";

Picture 2. Observing, enquiring, examining;

Picture 3. Perplexed, "what shall I do?"

Group F

Picture 1 (Fig. 51).

Mimic facial expression: Surprised.

Co-operating muscles:

- 1 + 2. The frontal muscle
- 18 + 19. The incisive muscles of the upper lip and the lower lip
- 22. The lip part of the sphincter muscle of the mouth

The eyebrows and the forehead: The entire eyebrows are considerably raised, and the forehead shows strongly marked transverse furrows.

The glabella region and the root of the nose: The soft parts over the glabella region are strongly pulled upwards, the root of the nose is narrowed.

The eyelids and the palpebral fissure: The cover fold of the upper lid is pulled considerably upwards, and the upper eye furrow can be clearly seen.

The infraorbital triangle and the infraorbital furrow: The medial corner of the infraorbital triangle is pulled somewhat upwards-medially. The medial part of the infraorbital furrow is also pulled upwards-medially. The lateral parts of the furrow are raised.

The nasal region: The tip of the nose is raised a trifle.

The mouth opening and the lips: The mouth opening is somewhat widened, but is reduced in breadth. The lips are slightly tightened and protrude.

The head: The mimicry is best seen if the head is bent slightly forwards and to the side.

The lower jaw: This is a little depressed.

Picture 2 (Fig. 51).

Mimic facial expression: Frightened.

Co-operating muscles:

- 1 + 2. The frontal muscle.
- 4. The eyebrow wrinkler
- 18 + 19. The incisive muscles of the upper lip and the lower lip

The eyebrows and the forehead: The entire eyebrows are slightly raised and their middle parts are depressed. The eyebrows have also been brought a little closer to each other. The forehead shows strongly marked transverse furrows.

The glabella region and the root of the nose: The soft parts over the glabella region are, of course, pulled slightly upwards, but because of the

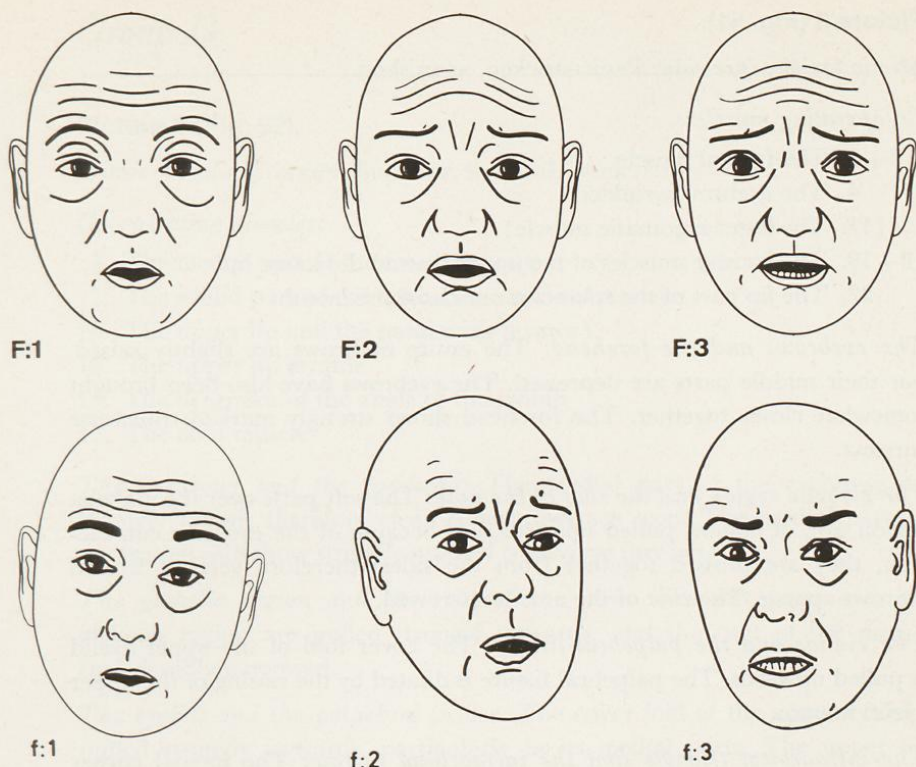


Fig. 51. Schematic presentation of mimic facial expressions, Group F.

Picture 1. Surprise;

Picture 2. Frightened;

Picture 3. Panic-stricken, anguished.

contraction of the eyebrows, they are pressed together from the sides; therefore vertical frontal furrows are seen. The root of the nose is narrowed a little.

The eyelids and the palpebral fissure: The cover fold of the upper eyelid is slightly pulled upwards.

The infraorbital triangle and the infraorbital furrow: The medial corner of the infraorbital triangle is pulled slightly upwards-medially. The medial part of the infraorbital furrow is also pulled upwards a little.

The nasal region: The tip of the nose is raised a trifle.

The mouth opening and the lips: The mouth opening is somewhat widened. The lips are fairly slack and protrude slightly.

The head: The mimicry is best seen if the head is bent backwards a little.

The lower jaw: This is slightly depressed.

Picture 3 (Fig. 51).

Mimic facial expression: Panic-stricken, anguished.

Co-operating muscles:

- 1 + 2. The frontal muscle
- 4. The eyebrow wrinkler
- (11. The lesser zygomatic muscle)
- 18 + 19. The incisive muscles of the upper lip and the lower lip
- 22. The lip part of the sphincter muscle of the mouth

The eyebrows and the forehead: The entire eyebrows are slightly raised, but their middle parts are depressed. The eyebrows have also been brought somewhat closer together. The forehead shows strongly marked transverse furrows.

The glabella region and the root of the nose: The soft parts over the glabella region are, of course, pulled upwards, but because of the eyebrow contraction, they are pressed together from the sides; therefore vertical frontal furrows appear. The root of the nose is narrowed.

The eyelids and the palpebral fissure: The cover fold of the upper eyelid is pulled upwards. The palpebral fissure is dilated by the raising of the upper eyelid margin.

The infraorbital triangle and the infraorbital furrow: The medial corner of the infraorbital triangle is pulled slightly upwards-medially. This also concerns the medial part of the infraorbital furrow.

The nasolabial furrow: This is pulled somewhat outwards, whereby a slight medially directed concavity appears.

The nasal region: The tip of the nose is raised a trifle.

The mouth opening and the lips: The mouth opening is considerably widened. The lips are fairly slack and protrude.

The head: The mimicry is best seen if the head is slightly bent backwards.

The teeth: The front teeth in the lower jaw are exposed.

The lower jaw: This is significantly depressed.

Picture 1 (Fig. 52).

Mimic facial expression: Superior, scornful, ironic.

Co-operating muscles:

1. The medial part of the frontal muscle
7. The eyelid part of the sphincter muscle of the eye
- (9. The upper lip and the nasal wing levator)
10. The upper lip levator
15. The depressor of the angle of the mouth
17. The chin muscle

The eyebrows and the forehead: The medial part of the eyebrows are strongly raised; therefore clear A-eyebrows are seen. The medial parts of the frontal skin show strongly marked transverse furrows.

The glabella region and the root of the nose: The soft parts over the glabella region are pulled strongly upwards, and the root of the nose is considerably narrowed.

The eyelids and the palpebral fissure: The cover fold of the upper eyelid is pulled strongly upwards, particularly in its medial parts. The upper eye furrow is emphasized. The palpebral fissure is much narrowed.

The infraorbital triangle and the infraorbital furrow: The medial corner of the infraorbital triangle is pulled somewhat upwards-medially. This also refers to the medial parts of the infraorbital furrow. The lateral parts of the furrow are raised.

The nasolabial furrow: This is considerably deepened and extended downwards and shows a medially directed weak concavity.

The nasal region: The lower parts of the nose are narrowed. The nasal wings are raised.

The mouth opening and the lips: The mouth opening is widened, and the angle of the mouth is pulled strongly downwards. The upper lip is raised and somewhat tightened. The lateral parts — situated immediately at the angle of the mouth — are pulled upwards-laterally, whereby a clear angular bend of the lower contour of the upper lip appears. The lower lip is somewhat depressed.

The chin: The soft parts over the chin boss are slightly tensed and rounded.

The teeth: These are exposed and perhaps clenched.

Picture 2 (Fig. 52).

Mimic facial expression: Contemptuous, condescending, supercilious.

Co-operating muscles:

1. The medial part of the frontal muscle
7. The eyelid part of the sphincter muscle of the eye
- (9. The upper lip and the nasal wing levator)
10. The upper lip levator
15. The depressor of the angle of the mouth
17. The chin muscle

The eyebrows and the forehead: The medial parts of the eyebrows are considerably raised and obvious A-eyebrows thus appear. The frontal skin, in its medial parts, shows strongly marked transverse furrows.

The glabella region and the root of the nose: The soft parts over the glabella region are pulled upwards, and the root of the nose is narrowed.

The eyelids and the palpebral fissure: The cover fold of the upper eyelid is pulled fairly strongly upwards, especially in its medial parts. The upper eye furrow is emphasized. The palpebral fissure is considerably narrowed.

The infraorbital triangle and the infraorbital furrow: The medial corner of the infraorbital triangle is pulled fairly strongly upwards-medially. This also refers to the medial part of the infraorbital furrow. The lateral parts of the furrow are raised.

The nasolabial furrow: This is strongly deepened and extended downwards and shows a medially directed weak concavity.

The nasal region: The lower parts of the nose are narrowed, and the nasal wings are pulled a trifle upwards. Clear swellings have appeared on the nasal bridge, and hints of transverse nasal bridge furrows can also be seen.

The mouth opening and the lips: The mouth is closed and, in the main, shows a downwards directed concavity. The angle of the mouth is pulled slightly downwards-outwards. The upper lip is pressed somewhat upwards. Its lateral parts, situated immediately at the angle of the mouth, are pulled slightly upwards-laterally, whereby a weak tendency for an angular bend appears in the lower contour of the upper lip. The lower lip is pressed slightly upwards and rolled outwards.

The chin: The soft parts over the chin boss are slightly tensed and rounded.

The head: Possibly bent backwards a trifle.

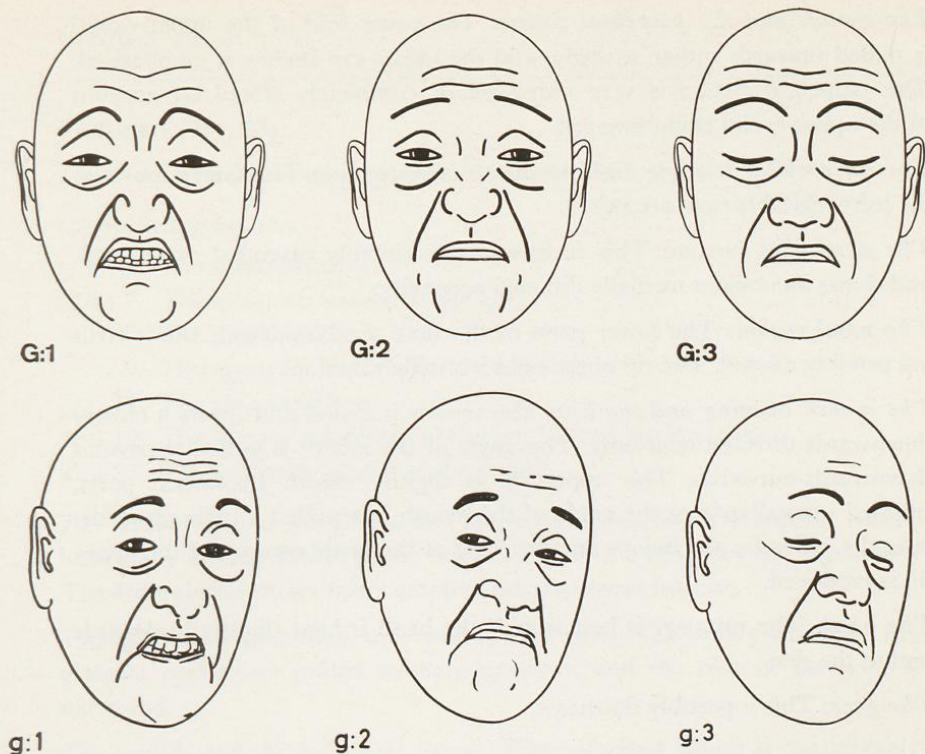


Fig. 52. Schematic presentation of mimic facial expressions, Group G.
 Picture 1. Superior, scornful, ironic;
 Picture 2. Contemptuous, condescending, supercilious;
 Picture 3. Arrogant, self-satisfied, self-sufficient.

Picture 3 (Fig. 52).

Mimic facial expression: Arrogant, self-satisfied, self-sufficient.

Co-operating muscles:

- 1 + 2. The frontal muscle
- 7. The eyelid part of the sphincter muscle of the eye
- 10. The upper lip levator
- 15. The depressor of the angle of the mouth

The eyebrows and the forehead: The entire eyebrows are considerably raised, and the forehead shows emphasized transverse furrows.

The glabella region and the root of the nose: The soft parts over the glabella region are strongly pulled upwards, and the root of the nose is much narrowed.

The eyelids and the palpebral fissure: The cover fold of the upper eyelid is pulled upwards rather strongly, and the upper eye furrow is emphasized. The palpebral fissure is very narrowed or completely closed on account of the upper eyelid being lowered.

The infraorbital triangle and the infraorbital furrow: The lateral parts of the infraorbital furrow are raised.

The nasolabial furrow: This furrow is considerably extended downwards and shows an obvious medially directed concavity.

The nasal region: The lower parts of the nose are broadened; the nostrils are possibly dilated. The tip of the nose is a trifle raised.

The mouth opening and the lips: The mouth is closed and shows a clearly downwards directed concavity. The angle of the mouth is pulled somewhat downwards-outwards. The upper lip is slightly raised. Its lateral parts, situated immediately at the angle of the mouth, are pulled a trifle upwards-laterally, whereby an obvious angular bend of the lower contour of the upper lip is produced.

The head: The mimicry is best seen if the head is bent slightly backwards and to the side.

The gaze: This is possibly downcast.

Picture 1 (Fig. 53).

Mimic facial expression: Disgusted, "it smells bad".

Co-operating muscles:

- 1 + 2. The frontal muscle
- 6 + 7. The sphincter muscle of the eye
- 8. The nasal muscle
- 9. The upper lip and the nasal wing levator
- 17. The chin muscle
- 18 + 19. The incisive muscles of the upper lip and the lower lip
- 22 + 23. The sphincter muscle of the mouth

The eyebrows and the forehead: The entire eyebrows are slightly raised, but mostly in their lateral parts; therefore there is a tendency for V-position. The frontal skin shows fairly emphasized transverse furrows.

The glabella region and the root of the nose: The soft parts over the glabella region are pulled strongly upwards, and the root of the nose is narrowed.

The eyelids and the palpebral fissure: The palpebral fissure is considerably contracted, and the lateral eye furrows are emphasized.

The infraorbital triangle and the infraorbital furrow: The infraorbital triangle is pressed slightly upwards, and its medial corner is pulled considerably upwards-medially. This refers also to the infraorbital furrow, whose medial part is pulled upwards. The lateral parts of the furrow are raised.

The nasal region: The lower part of the nose is narrowed, and the nasal wings are somewhat raised. The nostrils are fairly strongly constricted. Strongly marked swellings on the nasal bridge can be seen and also well-marked transverse nasal bridge furrows.

The mouth opening and the lips: The mouth is tightly pinched and reduced in breadth. The lips are tightened and slightly protrude.

The chin: The soft parts over the chin boss are raised a trifle and tensed.

The head: The head is possibly bent slightly forwards.

The teeth: Clenched.

Picture 2 (Fig. 53).

Mimic facial expression: Nauseated, "it tastes bad".

Co-operating muscles:

3. The glabella depressor
5. The eyebrow depressor
- 6+7. The sphincter muscle of the eye
8. The nasal muscle
9. The upper lip and the nasal wing levator
10. The upper lip levator
16. The lower lip depressor
- (22. The lip part of the sphincter muscle of the mouth)

The eyebrows and the forehead: The entire eyebrows are depressed.

The glabella region and the root of the nose: The soft parts over the glabella region are slightly depressed. Insignificantly marked vertical furrows can be seen on the forehead. The root of the nose is broadened a trifle and shows a slightly marked transverse furrow.

The eyelids and the palpebral fissure: The cover fold of the upper eyelid is pressed downwards. The palpebral fissure is screwed up. The lateral eye furrows are rather emphasized.

The infraorbital triangle and the infraorbital furrow: The infraorbital triangle is pressed slightly upwards; its medial corner is pulled upwards-medially. This applies also to the infraorbital furrow, whose medial part is pulled upwards-medially. The lateral parts of the furrow are raised a trifle.

The nasolabial furrow: This is considerably deepened and extended downwards. It shows a medially directed weak concavity or angular bend.

The nasal region: The nasal wings are raised a little and the nostrils are constricted. Strongly marked swellings on the nasal bridge and transverse nasal bridge furrows can be seen.

The mouth opening and the lips: The mouth opening is widened. The upper lip is raised, and its lateral parts, situated immediately at the angle of the mouth, are pulled considerably upwards-laterally; therefore there is a strong tendency for an angular bend of the lower contour of the upper lip. The lower lip is depressed and possibly rolled outwards.

The head: Possibly bent forwards a trifle.

The teeth: These are clenched and possibly exposed.

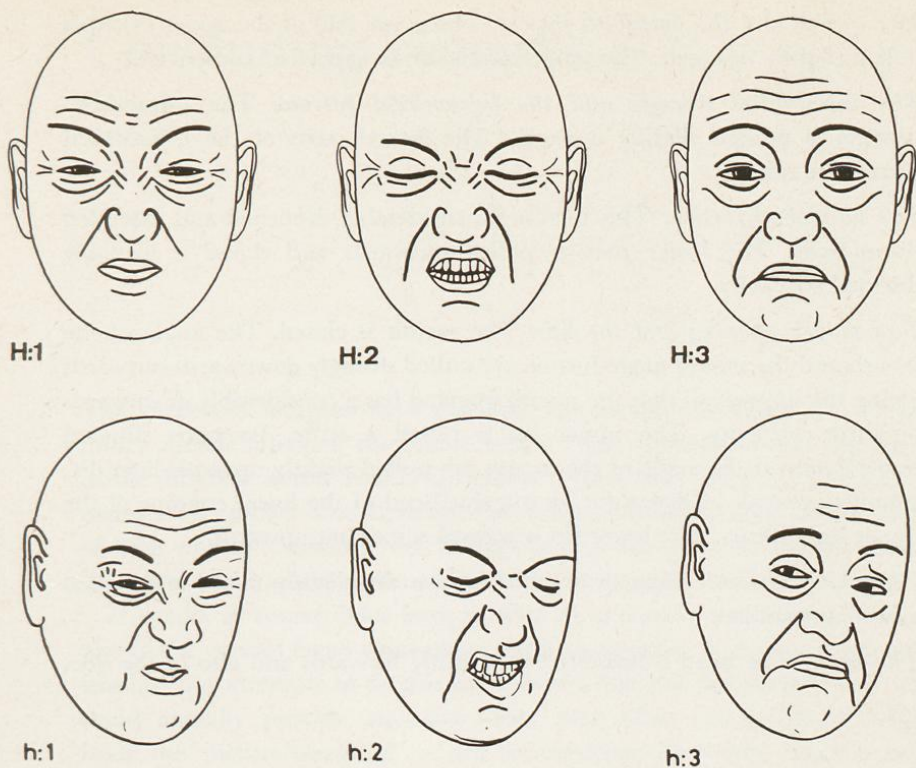


Fig. 53. Schematic presentation of mimic facial expressions, Group H.
 Picture 1. Disgusted, "it smells bad";
 Picture 2. Nauseated, "it tastes bad";
 Picture 3. Bitter, woeful, disappointed.

Picture 3 (Fig. 53).

Mimic facial expression: Bitter, woeful, disappointed.

Co-operating muscles:

1 + 2. The frontal muscle

7. The eyelid part of the sphincter muscle of the eye

(9. The upper lip and the nasal wing levator)

11. The lesser zygomatic muscle

15. The depressor of the angle of the mouth

17. The chin muscle

The eyebrows and the forehead: The entire eyebrows are raised slightly, and the frontal skin shows fairly emphasized transverse furrows.

The glabella region and the root of the nose: The soft parts over the glabella region are pulled upwards a little, and the root of the nose is narrowed.

The eyelids and the palpebral fissure: The cover fold of the upper eyelid is pulled slightly upwards. The palpebral fissure is somewhat constricted.

The infraorbital triangle and the infraorbital furrow: The infraorbital triangle is pressed slightly upwards. The lateral parts of the infraorbital furrow are raised.

The nasolabial furrow: This furrow is considerably deepened and extended downwards. The lower part is pulled outwards and shows a medially directed concavity.

The mouth opening and the lips: The mouth is closed. The angle of the mouth and the mouth angle furrow are pulled strongly downwards-outwards giving the impression that the mouth opening has a considerably downwards directed concavity. The upper lip is raised a trifle. Its parts situated immediately at the angle of the mouth are pulled slightly upwards-laterally, whereby a weak tendency for an angular bend of the lower contour of the upper lip appears. The lower lip is pressed somewhat upwards.

The chin: The soft parts over the chin boss are slightly raised and tensed as well as rounded.

The head: The head is possibly bent slightly forwards and also to the side.

Concluding remarks

The presented analyses have clarified the manner in which the various mimic muscle effects ("the mimic letters") are involved as subcomponents in the different mimic facial expressions ("the mimic words"). The picture material has shown how slight are the changes needed to alter the meanings of "the words". Although the feeling for this has probably existed earlier, the purely anatomical explanations have been largely lacking.

It would, of course, have been inviting to undertake a comparative study also of the various facial expressions. An investigation of this nature is quite feasible, but attempts to do this have shown that the descriptions — if they could actually provide anything other than what can be directly read from the picture material — are so extensive that they need a book to themselves and can under no circumstances be contained within the framework of this short work. The author has therefore chosen another method.

To guide those who wish to become further informed about this, in itself extremely interesting, matter, an Appendix 2 has been added. Here, will be found a table compiled of all the data recorded in connexion with the analyses in the previous chapter. The table contains 31 observed phenomena (called objects in the table) numbered from I (which is "the forehead") to XXXI (which is "possible direction of the gaze"). Under each such object, there are at least two and at the most six various alternatives for a change that has appeared or has failed to appear in connexion with the mimic play of features. Thus, under object VIII (which is "lateral eye furrows") only two alternatives are provided: 1. does not exist; 2. exists. Object II (which is "the eyebrows"), however, has six alternatives: 1. unaffected; - - -; 6. A-eyebrows. The table includes also the group classification of the emotional conditions from A to H, used at the analyses. It has thus been possible to record in the table how each group's three pictures are related to the alternatives mentioned under the various objects. For instance, it can be read from the table that when object IX (which is "the infraorbital triangle") is concerned, the three pictures in Group D are differently related to one another. In picture 1, the triangle is unaffected, in picture 2, it is pressed upwards, and in picture 3, it is also pressed upwards and has

a corner pulled upwards-medially. By studying the table, the reader is able to carry out the desired comparisons between the mimic facial expressions at various emotional conditions.

The data recorded in the table, however, can also be illustrated graphically. This has been done in the two diagrams added to the table. Diagram I includes the Groups A—D; diagram II, the Groups E—H. The left column in the diagram lists the 31 objects. Each Group has a system of squares containing at least two and at the most six squares, corresponding to the minimum two and maximum six alternatives of the various objects. In this system of squares (alternative system) the pictures appertaining to the Groups have been set in such a way that picture 3 is marked with an open circle, picture 2 with a +, and picture 1 with a filled circle. If picture 2 lies in the same square as picture 3, this is indicated with a + inside a circle. If picture 2 or picture 3, or both, lie in the same square as picture 1, the markings of each picture are, of course, blacked out by the filled circle. If, for instance, we consider object XI (which is "the nasolabial furrow") in diagram II, alternative 4 (i.e. square 4) refers to all three pictures in Group G; in Group F, alternative 1 refers to pictures 1 and 2, and alternative 5 refers to picture 3; in Group H, alternative 1 refers to picture 1, alternative 3 to picture 2, and alternative 4 to picture 3.

* *
*

With this, the author has completed the report of his investigation and has thereby also carried out a task that has occupied his thoughts, his pen, and his pencil for many years. He is fully conscious that much more remains to be observed, analysed, and evaluated, but hopes that the work now presented will at least arouse interest in the important sphere of functional anatomy and in the fascinating world called mimicry.

Appendixes

Appendix 1

Table showing the muscles that might have co-operated in the production of mimic facial expressions discussed in the present work. The table also includes some recorded positions.

Muscle and position	Group Picture	A			B			C		
		1	2	3	1	2	3	1	2	3
1 Pars med. m. frontalis						(+)	+			(+)
2 Pars lat. m. frontalis		(+)	+	+		(+)	+			(+)
3 M. procerus		+	+	+						
4 M. corr. supercillii										
5 M. depr. supercillii		+	+	+						
6 Pars orbit. m. orb. oculi					(+)		+	+	+	(+)
7 Pars palp. m. orb. oculi					+		+	+	+	+
8 M. nasalis										
9 M. lev. lab. sup. alae. nasi							+			
10 M. lev. labii superioris										
11 M. zygom. minor					+	+	+	+	+	+
12 M. zygom. major						+	+	+	+	+
13 M. caninus					+	+	+	+	+	+
14 M. risorius						+	+	+		+
15 M. triangularis			+	+						
16 M. depr. labii inferioris		(+)	+	+				+		
17 M. mentalis		(+)	+	+						
18+19 Mm. incisivi										
20+21 M. buccinator		(+)	(+)	+	(+)	(+)	+	(+)	+	
22 Pars lab. m. orb. oris										
23 Pars marg. m. orb. oris		+	+	+				+	(+)	+
Head bent forwards		(+)	(+)	(+)	(+)			+	+	
Head bent backwards							(+)			(+)
Head bent sideways					(+)			+	+	+
Head turned laterally					(+)			+	+	
Teeth clenched		+	+	+						(+)
Lower jaw dropped						(+)	+			
Iris set medially								+	+	
Iris looking down					(+)					

D			E			F			G			H		
1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
+	+				+	+	+	+	+	+	+	+		+
		+	+	+	+	+	+	+			+	+	+	
+	+						+	+						
		+	+	+								+	+	
		+										+	+	
(+)	(+)	+	+						+	+	+	+	+	+
		+							(+)	(+)		+	+	(+)
								(+)	+	+	+		+	+
+	+		(+)						+	+	+			+
+	+		+		+				+	+		+		+
		+	(+)			+	+	(+)				+		+
		+				+		+				+	(+)	
		+		+								+		
+	+		+	+	(+)	(+)						+	+	
		+	+	+		(+)	+	+	(+)	+				(+)
		+												
+	+	+	+	+	(+)	(+)			(+)			+		(+)
		+	(+)						(+)			+	(+)	(+)
						+	+	+						
+	+										+			

Appendix 2

Survey of produced mimic details. Two diagrams belong to the survey.
Diagram I shows the Groups A—B, Diagram II, E—H.

Object	Group							
	A	B	C	D	E	F	G	H
I Forehead								
1 Unaffected		1	1, 2	3	1, 2			2
2 Transverse frontal furrows		(2), 3	(3)		3	1, 2, 3	3	1, 3
3 Medial transverse frontal furrows				1, 2			1, 2	
4 Lateral transverse frontal furrows	(1), 2, 3							
II Eyebrows								
1 Unaffected		1	1					
2 Entirely raised		(2), 3	(3)		3	1	3	3
3 — ditto — but the middle parts depressed						2, 3		
4 Entirely depressed			2					2
5 V-eyebrows	1, 2, 3			3	1, 2			1
6 A-eyebrows				1, 2			1, 2	
III Soft parts of glabella region								
1 Unaffected		1	1, 2					
2 Pulled upwards		(2), 3	(3)	1, 2	3	1	1, 2, 3	1, 3
3 — ditto — with vertical furrows						2, 3		
4 Depressed with vertical furrows	1, 2, 3			3	1, 2			2
IV The root of the nose								
1 Unaffected		1	1, 2					
2 Narrowed		(2), 3	(3)	1, 2	3	1, 2, 3	1, 2, 3	1, 3
3 Broadened with transverse furrows	1, 2, 3			3	1, 2			2

Object	Group							
	A	B	C	D	E	F	G	H
V The cover fold of the upper eyelid								
1 Unaffected		1	1, 2, 3					1
2 Pulled upwards		(2), 3			3	1, 2, 3	3	3
3 — ditto — especially medially							1, 2	
4 Pressed downwards					1, 2			2
5 — ditto — especially medially	1, 2, 3			3				
6 — ditto — especially laterally				1, 2				
VI Influence of the cover fold								
1 No influence		1, 2, 3	1, 2, 3	3	1, 3	1, 2, 3	1, 2, 3	1, 2, 3
2 Screens the palpebral fissure	1, 2, 3			1, 2	2			
VII The palpebral fissure								
1 Unaffected	1, 2	2		1, 2	2, 3	1, 2		
2 Dilated	(3)					3		
3 Closed by the palpebral part							3	
4 Narrowed (= constricted)		(1), 3	1, 3		1		1, 2	1, 3
5 Screwed up			2	3				2
VIII Lateral eye furrows								
1 Do not exist	1, 2, 3			1	2, 3	1, 2, 3	1, 2, 3	3
2 Exist		1, 2, 3	1, 2, 3	2, 3	1			1, 2
IX Infraorbital triangle								
1 Unaffected	1, 2, 3			1	1, 2, 3		3	
2 Pressed upwards		1, 2	1, 2, 3	2				3
3 — ditto — with upwards-medially pulled corner		3		3				1, 2
4 Upwards-medially pulled corner						1, 2, 3	1, 2	

Object	Group							
	A	B	C	D	E	F	G	H

X Infraorbital furrow								
1 Unaffected	1, 2				1, 2			
2 Medial parts raised				(1)		2, 3		
3 Lateral parts raised		1, 2, 3	1, 2, 3				3	3
4 Medial and lateral parts raised				2, 3	3	1	1, 2	1, 2
5 Lateral parts pulled downwards	3							

XI Nasolabial furrow								
1 Unaffected				1	2	1, 2		1
2 Extended downwards	1				1, 3			
3 — ditto — with medially directed concavity	2	3						2
4 — ditto — with the lower part pulled outwards	3	1	2	2, 3			1, 2, 3	3
5 — ditto — with the lower part pulled outwards-upwards		2	1, 3			3		

XII Lower nasal breadth								
1 Unaffected or indeterminate	1, 2	3	2	1, 2, 3	1, 2, 3	1, 2, 3		2, 3
2 Increased	3	(1), 2	1, 3				3	
3 Reduced							1, 2	1

XIII Nasal bridge swellings								
1 Do not occur	1, 2, 3	1, 2	1, 2, 3	1, 2	1, 2, 3	1, 2, 3	1, 3	3
2 Occur		3		3			2	1, 2

XIV Nostrils								
1 Unaffected or indeterminate	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3	1, 2	3
2 Dilated							(3)	
3 Contracted								1, 2

Object	Group							
	A	B	C	D	E	F	G	H
XV Nasal wings								
1 Unaffected or indeterminate	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3	3	3
2 Raised							1, 2	1, 2
XVI Mouth opening, breadth								
1 Unaffected	1			1	1, 3	2	1, 2, 3	2, 3
2 Increased	3	1, 2, 3	1, 2, 3	2, (3)		(3)		
3 Reduced	2				2	1		1
XVII Mouth opening, basic shape								
1 Unaffected or indeterminate	1, 2				1, 2, 3	1, 2, 3	1	1, 2
2 Straight	3	1	2, 3	2				
3 Upwards directed concavity		2, 3	1					
4 Downwards directed concavity				1, 3			2, 3	3
XVIII Mouth, degree of opening								
1 Unaffected (=closed)		1	2, 3	1, 2	1, 2, 3		2, 3	3
2 Compressed	1, 2, 3			3				1
3 Widened		(2), 3	1			1, 2, 3	1	2
XIX Mouth angle								
1 Unaffected or indeterminate	1				2	1, 2, 3		1, 2
2 Pulled upwards-outwards		2, 3	1		3			
3 Pulled outwards		1	2, 3					
4 Pulled downwards-outwards	2, 3			1, 2, 3	1		1, 2, 3	3
XX Thickness of lips								
1 Unaffected or indeterminate	1, 2	1	2	1, 3	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3
2 Narrowed	3	2, 3	1, 3	2				

Object	Group							
	A	B	C	D	E	F	G	H
XXI Tightness of the lips								
1 Unaffected or indeterminate		1, 2			1, 3		2, 3	2, 3
2 Tightened	1, 2, 3	3	1, 2, 3	2, 3	2	1	1	1
3 Slack				1		2, 3		
XXII Protrusion of lips								
1 Does not occur	1, 2, 3	1, 2, 3	1, 2, 3	3	1		1, 2, 3	2, 3
2 Occurs				(1), 2	2, (3)	1, 2, 3		1
XXIII Position of upper lip								
1 Unaffected or indeterminate	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3		1
2 Lip raised with bent angle							1, 2, 3	2, 3
XXIV Position of lower lip								
1 Unaffected or indeterminate	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3	2, 3	1, 2	3	1
2 Depressed						(3)	1	2
3 Pressed upwards					1		2	3
XXV Soft parts of the chin, shape								
1 Unaffected or indeterminate	1	1, 2	1	1, 2, 3	1, 2, 3	1, 2, 3	3	1, 2
2 Smoothed out		3	2, 3					
3 Rounded	2, 3						1, 2	3
XXVI Soft parts of the chin, tension and position								
1 Unaffected or indeterminate		1, 2, 3	1, 2, 3		2	1, 2, 3	3	2
2 Tensed	1, 2, 3						1, 2	
3 Raised				1, 2	1, 3			
4 Raised and tensed				3				1, 3

OBJECT		A						B						C						D					
		1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
I	Forehead				●			●	⊕					●	○					○	●				
II	Eyebrows				●			●	⊕					●	○	+								○	●
III	Soft parts of glabella region				●			●	⊕					●	○								○		
IV	Root of the nose			●				●	⊕					●	○							○	●		
V	The cover fold of the upper eyelid				●			●	⊕					●										○	●
VI	Influence of the cover fold		●											●						○	●				
VII	The palpebral fissure	●	○					+		●						●	+							○	
VIII	Lateral eye furrows	●							●						●					●	⊕				
IX	Infraorbital triangle	●							●	○					●					●	+	○			
X	Infraorbital furrow	●			○												●				●		⊕		
XI	Nasolabial furrow	●	+	○						○	●	+				+	●			●		⊕			
XII	Lower nasal breadth	●	○					○	●					+	●					●					
XIII	Nasal bridge swellings	●						●	○					●						●					
XIV	Nostrils	●						●						●						●					
XV	Nasal wings	●	○					●						●						●					
XVI	Mouth opening, breadth	●	○	+					●						●					●	⊕				
XVII	Mouth opening, basic shape	●	○						●	⊕					⊕	●				●		+	●		
XVIII	Mouth, degree of opening	●							●	⊕					⊕	●				●	○				
XIX	Mouth angle	●			⊕				●	⊕					⊕	●				●				●	
XX	Thickness of the lips	●	●						⊕					+	●					●	+				
XXI	Tightness of the lips	●	●						○						●					⊕	●				
XXII	Protrusion of lips	●						●						●						○	●				
XXIII	Position of upper lip	●						●						●						●					
XXIV	Position of lower lip	●						●						●						●					
XXV	Soft parts of the chin, shape	●		⊕				●	○					●	⊕					●					
XXVI	Soft parts of the chin, tension and pos.	●												●								●	○		
XXVII	Head, possible position	●						+		○	●					●	○						●	○	
XXVIII	Teeth positioning	●						●						●						●	○				
XXIX	The teeth	●						●	○	+				●						●					
XXX	Position of lower jaw	●						●	⊕					●						●					
XXXI	Direction of gaze	●						⊕	●					○	●					○	●				

Diagram I

● = picture 1; also picture 2 and picture 3, unless these are specially indicated

+ = picture 2
○ = picture 3

⊕ = picture 2 plus picture 3

Object	Group							
	A	B	C	D	E	F	G	H
XXVII Head, possible position								
1 Unaffected		2					1	
2 Bent forwards	1, 2, 3							1, 2
3 Bent backwards		3				2, 3	2	
4 Bent forwards and sideways		1	1, 2	1, 2	1, 2, 3	1		3
5 Bent backwards and sideways			3	3			3	
XXVIII Distance between teeth of upper and lower jaw								
1 Unaffected or indeterminate		1, 2, 3	1, 2, 3	1, 2	1, 2, 3	1, 2, 3	2, 3	3
2 Clenched	1, 2, 3			3			(1)	1, 2

OBJECT		E						F						G						H					
		1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
I	Forehead	●	○					●						○	●					⊕	●				
II	Eyebrows	○				●		●	⊕					○				●		○		+	●		
III	Soft parts of glabella region		○		●			●	⊕					●						●		+			
IV	Root of the nose		○	●				●						●						●	+				
V	The cover fold of the upper eyelid	○		●				●						○	●					○		+			
VI	Influence of the cover fold	●	+					●						●						●					
VII	The palpebral fissure	⊕		●				○						○	●					○			●	+	
VIII	Lateral eye furrows	⊕	●					●						●						○	●				
IX	Infraorbital triangle	●										●		○			●			○	●				
X	Infraorbital furrow	●			○			⊕		●					●	●					○	●			
XI	Nasolabial furrow	+	●								○									●		+	○		
XII	Lower nasal breadth	●						●						○	●					⊕	●				
XIII	Nasal bridge swellings	●						●						●	+					○	●				
XIV	Nostrils	●						●						○	○					○	○		●		
XV	Nasal wings	●						●						○	○					○	○				
XVI	Mouth opening, breadth	●	+					+	○	○				●						⊕	●				
XVII	Mouth opening, basic shape	●						●						●			⊕						○		
XVIII	Mouth, degree of opening	●						●						⊕	●					○	○	+			
XIX	Mouth angle	+	○		●			●								●				●			○		
XX	Thickness of the lips	●						●												●					
XXI	Tightness of the lips	●	+					●	⊕					⊕	●					⊕	●				
XXII	Protrusion of lips	●	⊕					●						●						⊕	●				
XXIII	Position of upper lip	●						●						●						●	⊕				
XXIV	Position of lower lip	⊕		●				○						○	●	+				●	+	○			
XXV	Soft parts of the chin, shape	●						●						○	○	●				○	○				
XXVI	Soft parts of the chin, tension and pos.	+		●				●						○	○					+			●		
XXVII	Head, possible position				●				⊕	●				⊕	⊕		○						○		
XXVIII	Teeth positioning	●						●						⊕	⊕					○	○				
XXIX	The teeth	●						●			○			⊕	●					●	+				
XXX	Position of lower jaw	●						●						●						●					
XXXI	Direction of gaze	+	○	●				●						●	○					●					

Diagram II

● = picture 1; also picture 2 and picture 3, unless these are specially indicated

+ = picture 2
○ = picture 3

⊕ = picture 2 plus picture 3

Object	Group							
	A	B	C	D	E	F	G	H
XXIX The teeth								
1 Cannot be seen	1, 2, 3	1	2, 3	1, 2, 3	1, 2, 3	1, 2	2, 3	1, 3
2 Exposed		3					1	2
3 Front teeth of upper jaw exposed		(2)	(1)					
4 Front teeth of lower jaw exposed						3		
XXX Position of lower jaw								
1 Unaffected or indeterminate	1, 2, 3	1	1, 2, 3	1, 2, 3	1, 2, 3		1, 2, 3	1, 2, 3
2 Lower jaw depressed		(2), 3				1, 2, 3		
XXXI Direction of gaze								
1 Unaffected	1, 2, 3	2, 3	2, 3	3	2	1, 2, 3	1, 2	1, 2, 3
2 Downcast		1		1, 2	3		3	
3 Iris set medially			1		1			

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Carl-Herman Hjortsjö

Man's Face and Mimic Language

Mimicry is man's first language. The ability to mime thoughts and feelings is fundamental, and lies securely anchored in the genes. We humans are therefore extremely sensitive to changes in the play of facial features of our fellows. However, if anyone is asked to describe objectively his observations, no answer is forthcoming. We understand, or think we understand, the silent language of mimicry which we ourselves can also speak, but we know neither the letters of the language nor the spelling of the words.

Hardly any serious attempt has been made to investigate and to systematize the muscular activities that result in certain decisive facial expressions. This impelled the author — who over a number of years studied various motion-mechanical conditions in the human body — to penetrate this question, and problems connected with it, in more detail.

The book should interest medical and dental students and should also be of value to anthropologists, psychologists, teachers of the deaf and dumb, artists, actors, and to everybody interested in facial analysis and portrait interpretation.

The work is illustrated by a rich material of photographs, diagrams, and schematic drawings.

Carl-Herman Hjortsjö is professor of Anatomy and Head of the Department of Anatomy at Lund University, Sweden, a position he has held since 1948. His considerable production within the field of science is characterized by its pronounced systematic thought. In Sweden, Professor Hjortsjö has a well-earned reputation as the writer of several Textbooks of Anatomy and for the accomplishment of a number of investigations in the border areas between medical and humanistic research.